

Appendix B

Exhibit Log

Exhibit 1
City of Harrisburg Notice of Intent (NOI) dated March 3, 2003



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WATERSHED MANAGEMENT

OFFICIAL USE ONLY
PA _____

REGION 1

NOTICE OF INTENT (NOI)

03 MAR -7 PM 12:30

FOR COVERAGE UNDER NPDES GENERAL PERMIT
FOR STORMWATER DISCHARGES (PAG-13) FROM WATERSHED MANAGEMENT
SMALL MUNICIPAL SEPARATE STORM SEWER SYSTEMS (MS4s)

- (1) Please read attached instructions carefully before completing this application.
- (2) If your MS4 discharges into "special protection waters" (or is otherwise ineligible for permit coverage under this General Permit) do not complete this NOI; contact your DEP regional office for an individual permit application.
- (3) Municipalities are encouraged to submit this application jointly in conjunction with existing or proposed implementation of an Act 167 watershed stormwater management plan

A. Stormwater Management Plan Under Act 167

1.	Is this application being made jointly with other municipalities in conjunction with implementation of an existing or proposed Stormwater Management Plan (or plan update) under Act 167? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No If "Yes", please complete the information in a - d below
a.	Name of Act 167 watershed(s): Paxton Creek, Spring Creek
b.	Name of County(ies): Dauphin
c.	Status of existing Act 167 planning and implementation for the relevant watershed(s): The Dauphin County Conservation District is in the process of updating Act 167 Plans for both the Paxton Creek and Spring Creek Watersheds. <i>NOTE: MS4s must submit a "letter of intent" from the relevant county(ies) indicating the county commitment to proceed with Act 167 planning (or an update thereof) for the watershed</i>
d.	List of co-applicants (each co-applicant must complete an NOI): Lower Paxton Township, Susquehanna Township, Swatara Township, Pennbrook Borough, Paxtang Borough

B. Other Multi-Municipal Joint Application

1.	Is this application being made jointly with other municipalities in a common watershed <u>other than</u> under an Act 167 approach? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes", please complete the information below
a.	Name of Watershed(s): (attach map) _____
b.	Status of joint municipal planning for the relevant watershed(s):

c. List of co-applicants and contact persons (each co-applicant must complete an NOI):

C. MS4 Operator Information

1.	Name of MS4 Operator: City of Harrisburg	
2.	Contact Person: Christopher Blount	
3.	Title/Role: Civil Engineer	
4.	Division: Office of the City Engineer	Department: Department of Administration
5.	Phone Number: (717) 255-3091	Fax: (717) 255-3078
6.	E-mail: cblount@cityofhbg.com	
7.	Mailing Address:	Address Line 1: 123 Walnut Street
		Address Line 2: Suite 212
		City: Harrisburg
		Zip Code: 17101

D. MS4 Location Information

1..	Urbanized Area Name: Harrisburg	UA #: 6
2..	Status of MS4 Operator: <input type="checkbox"/> FEDERAL <input type="checkbox"/> STATE <input checked="" type="checkbox"/> PUBLIC <input type="checkbox"/> PRIVATE <input type="checkbox"/> OTHER If private or other, please include Name:	

E. Description of Receiving Waters (refer to the NOI instructions for more information).

List water bodies into which MS4(s) discharges, and their classification(s)

Name of Waterbody	Designated Uses	Existing Uses	303(d) Listed? (Y/N)	TMDL Parameter(s)
Paxton Creek /	WWF	WWF	Yes /	
Susquehanna River /	WWF	WWF	Yes /	PCB
Spring Creek /	CWF	WWF	Yes /	

F. Interconnected MS4(s)

1. List of Downstream MS4s - Name(s) of MS4(s) into which this MS4 directly discharges:

2.	List of Upstream MS4s - Name(s) of MS4(s) which directly discharge into this MS4:	

G. Stormwater Management Program

MS4 operators must submit their plan with BMPs, measurable goals and a schedule, as part of their NOI. This General Permit allows two options—follow DEP's recommended approach, or develop an independent program which must be approved by DEP.

MS4 Operator's Plan for Each Minimum Control Measure For each Minimum Control Measure required to be developed and implemented under the General Permit, applicants may choose to implement each stormwater management program measure according to the DEP Stormwater Management Protocol ("*Protocol*"), or develop and (upon DEP approval) implement their own stormwater management program measures that meet the requirements of this General Permit.

Therefore, MS4 operators have the option to implement one or more of the Minimum Control Measures according to the *Protocol* and identify and implement the remaining Minimum Control Measures through their own proposed approach.

MS4 operators who elect to implement the approved stormwater management program entirely under the *Protocol* and in conjunction with the Pa. Stormwater Management Act (Act 167), can be eligible to receive up to 75 percent funding for the permit requirements (for more details, refer to *Appendix 2* and the Fact Sheet.). In addition, their schedule is delayed 1 year in large part for each element in the *Protocol*.

Below, check the box(es) next to the Minimum Control Measure(s) for which the DEP *Protocol* will be followed, and check the box(es) next to the Minimum Control Measure(s) for which the MS4 operator will develop its own program. In addition, provide the names of the responsible person(s) for implementing the program for each Minimum Control Measure.

For any Minimum Control Measure in which the MS4 operator will not follow the DEP *Protocol*, the applicant is required to submit to DEP with this NOI its proposed stormwater management program, including BMPs, measurable goals and a schedule for DEP approval. See the NOI instructions for more detailed information. No documentation is required to be submitted with this NOI for those Minimum Control Measures in which the MS4 operator will be implementing the DEP *Protocol*.

The Protocol and/or the proposed program become part of the requirements of the permit upon approval by DEP, as applicable.

Minimum Control Measures	The MS4 Operator will implement the minimum control measure as described in the <i>DEP Protocol</i>	The MS4 Operator will develop its own program for this minimum measure.	Name and telephone number of the principal person responsible for Implementation
(1) Public Education and Outreach	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091
(2) Public Participation and Involvement	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091
(3) Illicit Discharge Detection and Elimination	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091
(4) Construction Site Stormwater Runoff Control	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091

(5) Post-Construction Stormwater Management in New Development and Redevelopment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091
(6) Pollution Prevention and Good Housekeeping for Municipal Operations and Maintenance	<input checked="" type="checkbox"/>	<input type="checkbox"/>	JOSEPH V. LINK (717) 255-3091

H. Compliance History Review

Is/was applicant in violation of any of DEP's permits issued by DEP, or any orders, regulations or schedules of compliance?

Yes ☐ No ☒

If yes, list each permit, order, regulation or schedule that is/was in violation and provide compliance status of the permitted activity (use additional sheets to provide information on all permits).

Brief Description of Non-Compliance:

Steps Taken to Return to Compliance and Dates Compliance Achieved:

I. Certification:

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Name and official title: (Use corporate or professional seal as appropriate)

Joseph V. Link, P.E., City Engineer

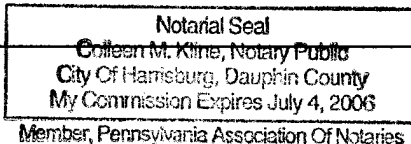
Signature: *Joseph V. Link*

Date Signed: 3/3/03

Sworn and subscribed to before me, this 3rd day of March, 2003.

Colleen M. Kline
Notary Public

My commission expires _____



(Notary Public Seal and Stamp)

Exhibit 2
Excerpts from MS4 Annual Reports submitted by the City of
Harrisburg to DEP, dated 2005 through 2009

Excerpts from MS4 Annual Reports submitted by the City to DEP

2005–2006 MS4 Annual Report:

MCM#3 (continued)	
12D.	BMP: Establish priority areas, conduct screening/sampling and take appropriate actions as needed. (Describe how the priority area was established and which outfalls were selected for screening during the past permit year. Summarize the results of your outfall screening/sampling. Include properly completed illicit discharge field screening form for any problem outfall. Include the illicit discharge quarterly summary report form. Describe the corrective actions taken to eliminate any illicit discharges or connections.)
	# Outfalls in system: <u>23</u> #Outfalls screened during the past permit year: <u>5</u>
	# Outfalls with dry weather flow during the past permit year: <u>0</u>
	# Outfalls sampled during the past permit year: <u>0</u>
	# Outfalls determined to have an illicit discharge or connection during past permit year: <u>0</u>
	<input checked="" type="checkbox"/> Measurable goal for this BMP was met. <input type="checkbox"/> Measurable goal for this BMP was not met.
	Describe how goal was met; or if not met, give an explanation and proposed corrective actions: Three years ago the City conducted an extensive project to eliminate all illicit discharges in its storm sewer system. The City found and corrected ## illicit discharges. During year 3 five outfalls were monitored twice during periods of dry weather. No illicit discharges were detected. (see attached photos)

2007–2008 MS4 Annual Report:

MCM#3 (continued)	
12D.	BMP: Establish priority areas, conduct screening/sampling and take appropriate actions as needed. (Describe how the priority area was established and which outfalls were selected for screening during the past permit year. Summarize the results of your outfall screening/sampling. Include properly completed illicit discharge field screening form for any problem outfall. Include the illicit discharge quarterly summary report form. Describe the corrective actions taken to eliminate any illicit discharges or connections.)
	Number of outfalls in system: <u>12</u>
	Number of outfalls screened during the past permit year: <u>4</u>
	Number of screenings conducted during the past permit year: <u>0</u>
	Number of outfalls/screenings with dry weather flow during the past permit year: <u>0</u>
	Number of dry weather flows sampled during the past permit year: <u>0</u>
	Number of outfalls determined to have an illicit discharge or connection during past permit year: <u>0</u>
	<input checked="" type="checkbox"/> Measurable goal for this BMP was met. <input type="checkbox"/> Measurable goal for this BMP was not met.
	Describe how goal was met; or if not met, give an explanation and proposed corrective actions: Four outfalls were selected that could be observed from River Front Park. Once following a storm and once during dry weather, the outlets were observed to determine whether any illicit discharge could be visually observed. None found.

2008–2009 MS4 Annual Report:

MCM#3 (continued)

12D. **BMP: Establish priority areas, conduct screening/sampling and take appropriate actions as needed.**
(Describe how the priority area was established and which outfalls were selected for screening during the past permit year. Summarize the results of your outfall screening/sampling. Include properly completed illicit discharge field screening form for any problem outfall. Include the illicit discharge quarterly summary report form. Describe the corrective actions taken to eliminate any illicit discharges or connections.)

Number of outfalls in system: 12

Number of outfalls screened during the past permit year: 4

Number of screenings conducted during the past permit year: 0

Number of outfalls/screenings with dry weather flow during the past permit year: 0

Number of dry weather flows sampled during the past permit year: 0

Number of outfalls determined to have an illicit discharge or connection during past permit year: 0

☒ Measurable goal for this BMP was met.

☐ Measurable goal for this BMP was not met.

Describe how goal was met; or if not met, give an explanation and proposed corrective actions: One inlet on Front St and 3 other inlets were selected to be observed during both wet and dry weather. Nothing unusual was found.

Exhibit 3
Outfall Observation Locations #3 and #4

Outfall Observation Locations #3 and #4

The Map Legend was copied from the GIS-based map of the MS4 provided to the EPA Inspection Team by the City. The Map Legend was then added to a scanned portion of the GIS-based map of the MS4 to create the graphic below, which displays the location of Outfall Observation Locations #3 and #4. Note that only one of the outfalls was observed at Outfall Observation Location #3. In addition, the map displays a privately-owned inlet at Outfall Observation Location #4 and but does not display the corresponding outfall.

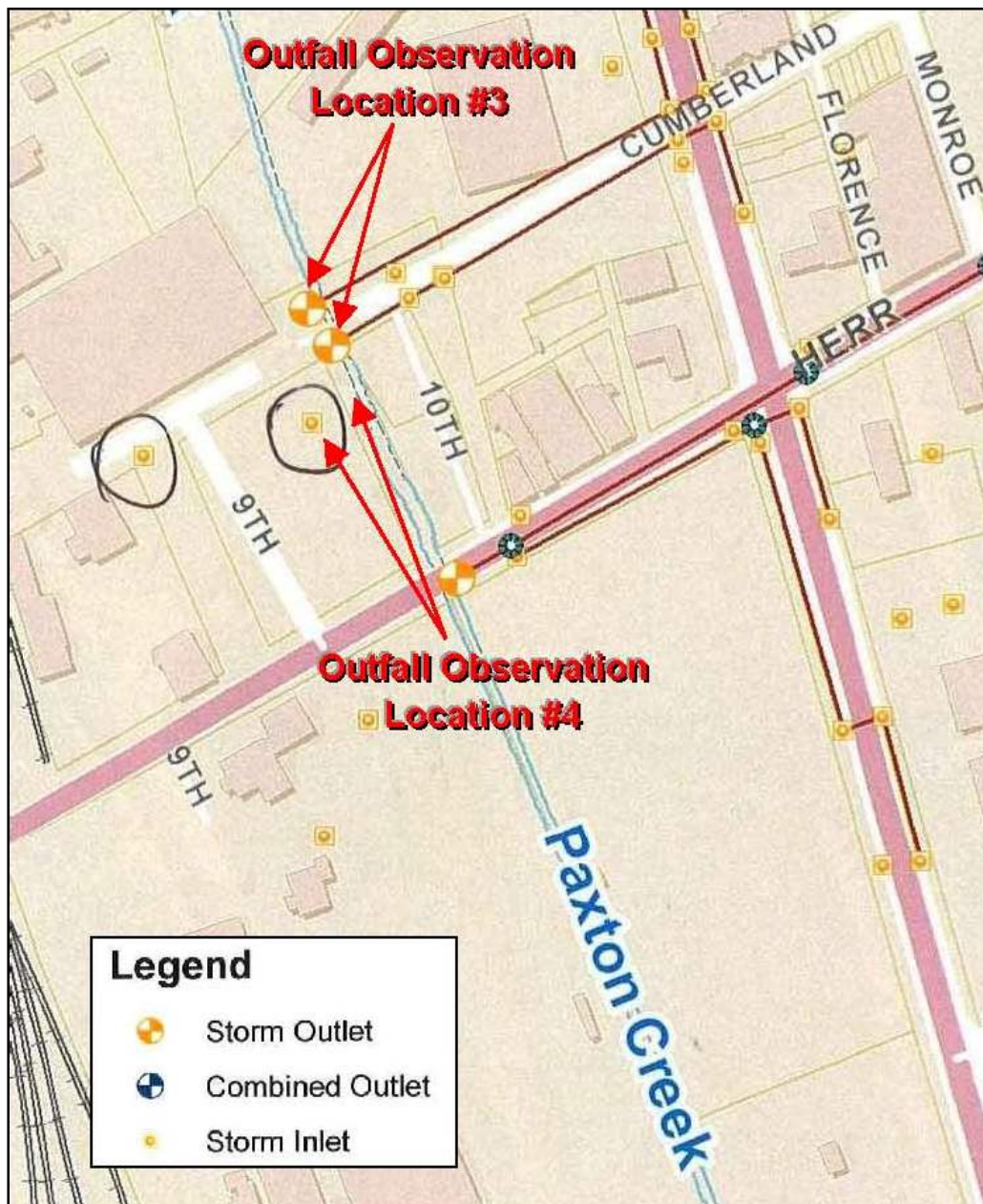


Exhibit 4
EPA Inspection Team Records Request, dated July 22, 2010

**MS4 PROGRAM COMPLIANCE INSPECTION
CITY OF HARRISBURG, PA
JULY 22—23, 2010**

Records Requested:

Program Management/ Kick-off Meeting

1. Current Storm Water Management Program document—written description of your current MS4 Programs/Program Areas (e.g., Stormwater Management Program)
2. MS4 Annual Report 2010 (permit year March 10, 2009 through March 9, 2010)
3. Program organizational chart and/or a description of the departments involved in the implementation of your MS4 program and their responsibilities.
4. Current land use and receiving waters map—City background, demographics, and context
5. Completed Act 167 Plan (if applicable)

Construction Site Runoff Control

6. All ordinances pertaining to land disturbing activities
7. All other construction-related regulatory mechanisms (e.g., land disturbance or grading permit)
8. Any formal agreements with the local CCD for implementation of municipal responsibilities pertaining to Construction Site Runoff Control (e.g., memorandum of understanding)
9. Construction BMP Field Manual
10. Inventory of current active construction sites with location (differentiating municipally sponsored from private projects)
11. Example/case file of a construction site issue where enforcement of local ordinance was used (ideally full extent of enforcement authority)
12. Records of follow up actions to citizen/employee complaints regarding construction site issues (March 10, 2009 to current)

Post-Construction Stormwater Management

13. All storm water related ordinances and regulatory mechanisms pertaining to development and redevelopment
14. Any formal agreements with the local CCD for implementation of municipal responsibilities pertaining to Post-Construction Stormwater Management (e.g., memorandum of understanding)
15. Watershed-specific requirements/criteria for post-construction BMPs
16. Post Construction BMP Manual and design standards
17. Inventory of post-construction BMPs with location (differentiating municipally owned and operated from private)
18. Requirements for continued maintenance of BMPs

Illicit Discharge Detection and Elimination (IDDE)

19. Ordinance or regulatory mechanism prohibiting non-storm water discharges to the MS4, and any approvals from DEP for modification of the model ordinance.
20. Onsite demonstration of storm drain system mapping tools. Emphasize layers/mapping that informs the MS4 program activities (e.g., storm drain system, structural controls, outfalls, receiving waters, etc.)
21. Priority List of risk areas in the storm drain system (March 10, 2009 to current)
22. Written description of field screening program and IDDE elimination procedures
23. Records of Priority List outfall inspections/dry weather field screening and monitoring (March 10, 2009 to current)
24. Inventory—reported incidents of illicit discharges/connections/spills and resolution (March 10, 2009 to current)
25. Example/case file of an illicit discharge incident where enforcement was used (ideally full extent of enforcement authority)

Pollution Prevention for Municipal Operations and Maintenance

26. Inventory of municipal facilities/corporate yards
27. Written description of operation, maintenance and inspection program for stormwater facilities/ post-construction BMPs (e.g. Stormwater Facility Operations and Maintenance Program)
28. Standard operating procedures (SOPs) for catch basin and post-construction BMP inspections, and checklists used in the field
29. Records of post-construction BMP and catch basin inspection and maintenance (March 10, 2009 to current)
30. Municipal employee training records and syllabus
31. Written description of Vehicle Operations and Maintenance Program

***Note: In addition to the numbered items requested, also provide any other documents or tools that you believe demonstrate program development and structure. EPA may request additional information at a later date. Also, if Harrisburg representatives wish to provide additional information at a later date, they may do so.**

Exhibit 5
List of Illicit Connections to MS4, dated February through
September 2002

*ID'd during
Paxton Creek Per 167 Survey
This is resolution*

*7/23/10
AD*

**CITY OF HARRISBURG
ADVANCED WASTEWATER TREATMENT FACILITY
SANITARY SEWER OVERFLOW PROGRAM
Cross Connection Status**

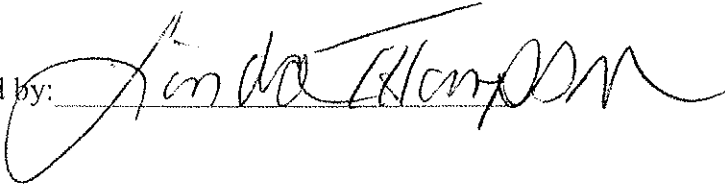
Location	Description	Present Status	Corrective Action Taken	Dated Corrected
Rolleston and Pemberton Streets	Cross connection from manhole to storm sewer discharging to Spring Creek.	Corrected	Manhole cross connection sealed by City Services.	02/26/02
Dunkle and Shellis Streets	Cross connection from manhole to storm sewer discharging to Paxton Creek.	Corrected	Manhole weir sealed off by City Services.	04/17/02
1006 Market Street	Sanitary sewer line leak discharging to Paxton Creek.	Corrected	Sanitary sewer line capped by City's Bureau of Sewerage.	07/16/02
245 Seneca Street	Direct connection to storm sewer discharging to Susquehanna River.	Corrected	Connected to sanitary sewer by City Services.	07/18/02
Subway Cafe	Direct connection to storm sewer discharging to Paxton Creek.	Corrected	Connected to sanitary sewer by City Services.	07/23/02
27 North Cameron Street	Direct connection to storm sewer discharging to Paxton Creek.	Corrected	Connected to sanitary sewer by owner.	07/23/02
10th and Market Streets	Sanitary sewer line leak to Paxton Creek. (Extensive dye and smoke testing revealed no direct connection)	Corrected	Chemically grouted (plugged) 8 inch line from creek to 10th street.	09/26/02
1026 Herr Street	Direct connection to storm sewer discharging to Paxton Creek.	Corrected	Connected to sanitary sewer by owner.	09/26/02

Note: The sanitary sewer cross connections were discovered in the mid to late 2001.
The Rolleston and Dunkle Street sanitary sewer cross connections were discovered in 2002.

Exhibit 6
City of Harrisburg's Stormwater Ordinance, approved December
6, 2006

BILL NO. 22 - 2006

Moved by:



An ordinance replacing Chapter 9-900 of the Codified Ordinances of the City of Harrisburg, entitled "Storm Water Management" by adopting "Spring Creek and Paxton Creek Watershed Act 167 Stormwater Management Plan", which was approved and adopted by both the County of Dauphin and the Department of Environmental Protection.

WHEREAS, the purpose of this ordinance is to promote health, safety and the welfare within the Spring Creek and Paxton Creek Watershed by minimizing the harms and maximizing the benefits of managing stormwater runoff, and;

WHEREAS, the updated watershed plan for Spring Creek and Paxton Creek Watershed, was adopted by Dauphin County and approved by the Department of Environmental Protection (hereinafter, "DEP") pursuant to the Stormwater Management Act, Act of October 4, 1978, 32P.S., P.L. 864, (No. 167), Section 680.1 et seq, as amended by Act 63 of May 24, 1984 and the Stormwater Management Guidelines adopted by the General Assembly, and;

WHEREAS, the subject plan was reviewed by DEP and it was determined to be consistent with municipal floodplain management plans, consistent with State and Federal flood control programs, is compatible with other watershed stormwater plans within the surrounding basin, and is consistent with the policies and purposes of the Stormwater Management Act; and,

WHEREAS, Section 11(b) of the Stormwater Management Act requires the adoption and approval of the subject plan by each municipality within the subject watershed by such ordinances and regulations, including zoning, subdivision and development, building code, and erosion and sedimentation ordinances

33 as are necessary to regulate development with in the municipality in a manner consistent with the
34 applicable watershed stormwater plan and the provisions of the Stormwater Management Act; and
35

36 **WHEREAS**, the City is requested to notify DEP when it is compliant; and
37

38 **NOW, THEREFORE, BE IT ORDAINED BY THE COUNCIL OF THE CITY OF**
39 **HARRISBURG, AND IT IS HEREBY ENACTED BY AUTHORITY OF THE SAME**, as follows:
40
41
42
43
44
45

3rd Gloria Martin Roberts

Date 12/16/09
Mayor [Signature]

Returned to City Council with objections

Approved

☐☒

Passed the City Council
Attest [Signature]
City Clerk
President of City Council
New Green White
November 28 2009

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ARTICLE I-GENERAL PROVISIONS

9-900 Statement of Findings

- (a) The governing body of the City of Harrisburg finds that:
- (1) Inadequate management of accelerated stormwater runoff resulting from development throughout a watershed increases flood flows and velocities, contributes to erosion and sedimentation, overtakes the carrying capacity of existing streams and storm sewers, greatly increases the cost of public facilities to convey and manage stormwater, undermines floodplain management and flood reduction efforts in upstream and downstream communities, reduces groundwater recharge, and threatens public health and safety.
 - (2) A comprehensive program of stormwater management, including reasonable regulation of development and activities causing accelerated erosion, is fundamental to the public health, safety, welfare, and the protection of the people of the City and all the people of the Commonwealth, their resources, and the environment.
 - (3) Inadequate planning and management of stormwater runoff resulting from land development and redevelopment throughout a watershed can also harm surface water resources by changing the natural hydrologic patterns; accelerating stream flows (which increase scour and erosion of streambeds and stream banks thereby elevating sedimentation); destroying aquatic habitat; and elevating aquatic pollutant concentrations and loadings such as sediments, nutrients, heavy metals, and pathogens. Groundwater resources are also impacted through loss of recharge.
 - (4) Stormwater can be an important water resource by providing groundwater recharge for water supplies and base flow of streams, which also protects and maintains water quality.
 - (5) Public education on the control of pollution from stormwater is an essential component in successfully addressing stormwater.
 - (6) Federal and state regulations require certain Cities to implement a program of stormwater controls. These Cities are required to obtain a permit for stormwater discharges from their separate storm sewer systems under the National Pollutant Discharge Elimination System (NPDES).
 - (7) Non-stormwater discharges to City separate storm sewer system can contribute to pollution of waters of the Commonwealth by the City.

9-901 Purpose

- (a) The purpose of this Ordinance is to promote health, safety, and welfare within the Spring Creek and Paxton Creek Watershed by minimizing the harms and maximizing the benefits described in 9-900 of this Ordinance through provisions designed to:
- (1) Manage accelerated runoff and erosion and sedimentation problems at their source, by regulating activities that cause these problems.
 - (2) Utilize and preserve the existing natural drainage systems.

- (3) Encourage infiltration of stormwater, where appropriate, to maintain groundwater recharge, to prevent degradation of surface and groundwater quality, and to otherwise protect water resources.
- (4) Maintain existing flows and quality of streams and watercourses in the City and the Commonwealth.
- (5) Preserve and restore the flood-carrying capacity of streams and prevent to the extent possible, scour and erosion of stream banks and streambeds.
- (6) Provide proper operations and maintenance of all temporary and permanent stormwater management facilities and BMPs that are constructed and implemented in the City.
- (7) Provide performance standards and design criteria for watershed-wide stormwater management and planning.
- (8) Manage stormwater impacts close to the runoff source, with a minimum of structures and a maximum use of natural processes.
- (9) Meet legal water quality requirements under state law, including regulations at 25 Pa. Code Chapter 93.4a to protect and maintain "existing uses" and maintain the level of water quality to support those uses in all streams and to protect and maintain water quality in "special protection" streams.
- (10) Provide a mechanism to identify controls necessary to meet the NPDES permit requirements.
- (11) Implement an illegal discharge detection and elimination program to address non-stormwater discharges into the City's separate storm sewer system.

9-902 Statutory Authority

(a) Primary Authority:

The City is empowered to regulate land use activities that affect runoff by the authority of the Act of October 4, 1978 32 P.S., P.L. 864 (Act 167) Section 680.1 et seq., as amended, the "Storm Water Management Act", [and the applicable City Code].

(b) Secondary Authority:

The City also is empowered to regulate land use activities that affect runoff by the authority of the Act of July 31, 1968, P.L. 805, No. 247, The Pennsylvania Municipalities Planning Code, as amended by Act 170 of December 21, 1988 and Act 131 of December 14, 1992.

9-903 Applicability

- (a) This Ordinance shall apply to those areas of the City that are located within the Spring Creek Watershed, as delineated in Plate 5 and Paxton Creek Watershed, as delineated in Plate 6 of the Spring Creek and Paxton Creek Act 167 Stormwater management plan, which is hereby adopted as part of this Ordinance, any Regulated Activity within the City, and all stormwater runoff entering into the City's separate storm sewer system from lands within the boundaries of the City.

- 209
210
211 (b) Earth Disturbance activities and associated stormwater management controls are also regulated
212 under existing state law and implementing regulations. This Ordinance shall operate in
213 coordination with those parallel requirements; the requirements of this Ordinance shall be no
214 less restrictive in meeting the purposes of this Ordinance than state law.
215
216 (c) The following activities are defined as "Regulated Activities" and shall be regulated by this
217 Ordinance:
218
219 (1) Land development.
220 (2) Subdivision.
221 (3) Construction of new or additional impervious or semi-pervious surfaces (driveways, parking
222 lots, etc.).
223 (4) Construction of new buildings or additions to existing buildings.
224 (5) Diversion or piping of any natural or man-made stream channel.
225 (6) Installation of stormwater management facilities or appurtenances thereto.
226 (7) Earth Disturbance Activities.
227
228

229 **9-904 Duty of Persons Engaged in the Development of Land**
230

- 231 (a) Notwithstanding any provision(s) of this Ordinance, including exemptions, any landowner or any
232 person engaged in the alteration or development of land which may affect stormwater runoff
233 characteristics shall implement such measures as are reasonably necessary to prevent injury to
234 health, safety, or other property. Such measures also shall include actions as are required to
235 manage the rate, volume, direction, and quality of resulting stormwater runoff in a manner which
236 otherwise adequately protects health, property, and water quality.

ARTICLE II-DEFINITIONS

9-905 Definitions

(a) For the purposes of this Ordinance, certain terms and words used herein shall be interpreted as follows:

- (1) Words used in the present tense include the future tense; the singular number includes the plural and the plural number includes the singular; words of masculine gender include feminine gender; and words of feminine gender include masculine gender.
- (2) The word "includes" or "including" shall not limit the term to the specific example but is intended to extend its meaning to all other instances of like kind and character.
- (3) The word "person" includes an individual, firm, association, organization, partnership, trust, company, corporation, or any other similar entity.
- (4) The words "shall" and "must" are mandatory; the words "may" and "should" are permissive.
- (5) The words "used or occupied" include the words "intended, designed, maintained, or arranged to be used, occupied or maintained".

Accelerated Erosion - The removal of the surface of the land through the combined action of human activity and the natural processes at a rate greater than would occur because of the natural process alone.

Agricultural Activities - The work of producing crops and raising livestock including tillage, plowing, disking, harrowing, pasturing and installation of conservation measures. Construction of new buildings or impervious area is not considered an agricultural activity.

Alteration - As applied to land, a change in topography as a result of the moving of soil and rock from one location or position to another; changing of surface conditions by causing the surface to be more or less impervious; land disturbance.

Applicant - A landowner, developer, or other person who has filed an application for approval to engage in any Regulated Activities at a project site within the City.

BMPs (Best Management Practices) - Activities, facilities, designs, measures or procedures used to manage stormwater impacts from Earth Disturbance activities; to meet State Water Quality Requirements; to promote groundwater recharge; and to otherwise meet the purposes of this Ordinance. BMPs include, but are not limited to: infiltration, filter strips, low impact design, bioretention, wet ponds, permeable paving, grassed swales, forested buffers, sand filters, and detention basins.

Channel Erosion - The widening, deepening, and headward cutting of small channels and waterways, due to erosion caused by moderate to large floods.

Cistern - An underground reservoir or tank for storing rainwater.

City - The City of Harrisburg, Dauphin County, Pennsylvania

Conservation District - The Dauphin County Conservation District.

286
 287 **Culvert** - A structure with appurtenant works that carries a stream under or through an embankment or
 288 fill.
 289
 290 **Dam** - An artificial barrier, together with its appurtenant works, constructed for the purpose of
 291 impounding or storing water or another fluid or semifluid, or a refuse bank, fill or structure for highway,
 292 railroad or other purposes which does or may impound water or another fluid or semifluid.
 293
 294 **DEP** - The Pennsylvania Department of Environmental Protection.
 295
 296 **Design Storm** - The magnitude and temporal distribution of precipitation from a storm event measured
 297 in probability of occurrence (e.g. a 25-year storm) and duration (e.g. 24-hours), used in the design and
 298 evaluation of stormwater management systems.
 299
 300 **Designee** - The agent of the City of Harrisburg and/or agent of the governing body involved with the
 301 administration, review or enforcement of any provisions of this Ordinance by contract or memorandum
 302 of understanding.
 303
 304 **Detention Basin** - An impoundment structure designed to manage stormwater runoff by temporarily
 305 storing the runoff and releasing it at a predetermined rate.
 306
 307 **Developer** - A person, partnership, association, corporation, or other entity, or any responsible person
 308 therein or agent thereof, that undertakes any Regulated Activity of this Ordinance.
 309
 310 **Development** - See "Earth Disturbance Activity". This term includes redevelopment.
 311
 312 **Development Site – Site** - The specific tract of land for which a Regulated Activity is proposed.
 313
 314 **Downslope Property Line** - That portion of the property line of the lot, tract, or parcels of land being
 315 developed located such that all overland or pipe flow from the site would be directed towards it.
 316
 317 **Drainage Conveyance Facility** - A stormwater management facility designed to transmit stormwater
 318 runoff and shall include streams, channels, swales, pipes, conduits, culverts, storm sewers, etc.
 319
 320 **Drainage Easement** - A right granted by a landowner to a grantee, allowing the use of private land for
 321 stormwater management purposes.
 322
 323 **Drainage Permit** - A permit issued by the City governing body after the Drainage Plan has been
 324 approved. Said permit is issued prior to or with the final City approval.
 325
 326 **Drainage Plan** - The documentation of the stormwater management system, if any, to be used for a
 327 given development site, the contents of which are established in 9-918.
 328
 329 **Drainageway** - Any natural or artificial watercourse, trench, ditch, pipe, swale, channel, or similar
 330 depression into which surface water flows.
 331
 332 **Earth Disturbance Activity** - See 25 Pa. Code Chapter 102, except that this Ordinance does not further
 333 regulate agricultural plowing or tilling.
 334
 335 **Erosion** - The movement of soil particles by the action of water, wind, ice or other natural forces.

Erosion and Sediment Pollution Control Plan - A plan, which is designed to minimize accelerated erosion and sedimentation.

Exceptional Value Waters - Surface waters of high quality, which satisfies Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards 93.4b(b) (relating to anti-degradation)

Existing Conditions - The initial condition of a project site prior to the proposed construction. If the initial condition of the site is undeveloped land, the land use shall be considered as "meadow" unless the natural land cover is proven to generate lower Curve Numbers or Rational "C" value, such as forested lands.

Flood - A general but temporary condition of partial or complete inundation of normally dry land areas from the overflow of streams, rivers and other waters of the Commonwealth.

Floodplain - Any land area susceptible to inundation by water from any natural source or delineated by applicable Federal Emergency Management Agency (FEMA) as being a special flood hazard area. Also included are areas that comprise Group 13 Soils, as listed in Appendix A of the Pennsylvania Department of Environmental Protection (PA DEP) Technical Manual for Sewage Enforcement Officers (as amended or replaced from time to time by PA DEP).

Floodway - The channel of the watercourse and those portions of the adjoining floodplains that are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by FEMA. In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed - absent evidence to the contrary - that the floodway extends from the stream to 50 feet from the top of the bank of the stream.

Forest Management/Timber Operations - Planning and activities necessary for the management of forestland. These include timber inventory and preparation of forest management plans, silvicultural treatment, cutting budgets, logging road design and construction, timber harvesting, site preparation and reforestation.

Freeboard - A vertical distance between the elevation of the design high water and the top of a dam, levee, tank, basin, or diversion ridge. The space is required as a safety margin in a pond or basin.

Grade - A slope, usually of a road, channel or natural ground specified in percent and shown on plans as specified herein. **(To) Grade** - to finish the surface of a roadbed, top of embankment or bottom of excavation.

Grassed Waterway - A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.

Groundwater Recharge - Replenishment of existing natural underground water supplies.

HEC-HMS Model Calibrated - (Hydrologic Engineering Center Hydrologic Modeling System) A computer-based hydrologic model technique adapted to the Spring Creek and Paxton Creek Watershed for the Act 167 Plan. The model has been calibrated by adjusting key model input parameters.

High Quality Waters - Surface water having quality, which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying Pennsylvania Code Title 25 Environmental Protection, Chapter 93 Water Quality Standards 93.4b(a).

Hydrologic Soil Group (HSG) - Infiltration rates of soils vary widely and are affected by subsurface permeability as well as surface intake rates. Soils are classified into four HSG's (A, B, C, and D) according to their minimum infiltration rate, which is obtained for bare soil after prolonged wetting. The Natural Resources Conservation Service (NRCS) of the US Department of Agriculture defines the four groups and provides a list of most of the soils in the United States and their group classification. The soils in the area of interest may be identified from a soil survey report, which can be obtained from local NRCS office or Dauphin County Conservation District office.

Impervious Surface (Impervious Area) - A surface that prevents the percolation of water into the ground. Impervious surface includes, but is not limited to: any roof, parking or driveway areas, and any new streets and sidewalks. Any surface areas designed to initially be gravel or crushed stone shall be assumed to be impervious surfaces.

Impoundment - A retention or detention basin designed to retain stormwater runoff and release it at a controlled rate.

Infiltration Structures - A structure designed to direct runoff into the ground (e.g. french drains, seepage pits, seepage trench).

Inlet - A surface connection to a closed drain. A structure at the diversion end of a conduit. The upstream end of any structure through which water may flow.

Karst - A type of topography or landscape characterized by depressions, sinkholes, limestone towers and steep-sided hills, underground drainage, and caves. Karst is formed on carbonate rocks, such as limestone or dolomites and sometimes gypsum.

Land Development - Development - (i) The improvement of one lot or two or more contiguous lots, tracts or parcels of land for any purpose involving (a) a group of two or more buildings, or (b) the division or allocation of land or space between or among two or more existing or prospective occupants by means of, or for the purpose of streets, common areas, leaseholds, condominiums, building groups, or other features; (ii) Any subdivision of land; (iii) Development in accordance with Section 503(1.1) of the PA Municipalities Planning Code.

Land/Earth Disturbance - Any activity involving grading, tilling, digging, or filling of ground or stripping of vegetation or any other activity that causes an alteration to the natural condition of the land.

Main Stem (Main Channel) - Any stream segment or other runoff conveyance facility used as a reach in the Spring Creek and Paxton Creek watershed hydrologic model.

Manning Equation in (Manning formula) - A method for calculation of velocity of flow (e.g. feet per second) and flow rate (e.g. cubic feet per second) in open channels based upon channel shape, roughness, depth of flow and slope. "Open channels" may include closed conduits so long as the flow is not under pressure.

Minimum Separation Distance - The minimum distance between the discharge of runoff from impervious surfaces and the receiving stream, storm sewer, or property line, whichever is smaller,

whether the discharge is point or non-point. It is intended to provide ample, natural, undisturbed vegetated pervious areas to allow for infiltration of increased volumes of runoff.

Municipality, - The City of Harrisburg Dauphin County, Pennsylvania.

Nonpoint Source Pollution - Pollution that enters a water body from diffuse origins in the watershed and does not result from discernible, confined, or discrete conveyances.

NPDES - National Pollutant Discharge Elimination System, the federal government's system for issuance of permits under the Clean Water Act, which is delegated to DEP in Pennsylvania.

NRCS - Natural Resource Conservation Service (previously SCS).

Open Channel - A drainage element in which stormwater flows with an open surface. Open channels include, but shall not be limited to, natural and man-made drainage ways, swales, streams, ditches, canals, and pipes flowing partly full.

Outfall - (i) Point where water flows from a conduit, stream, or drain; (ii) "Point source" as described in 40 CFR § 122.2 at the point where the City's storm sewer system discharges to surface waters of the Commonwealth.

Outlet - Points of water disposal from a stream, river, lake, tidewater, or artificial drain.

Parking Lot Storage - Involves the use of impervious parking areas as temporary impoundments with controlled release rates during rainstorms.

Peak Discharge - The maximum rate of stormwater runoff from a specific storm event.

Person - An individual, partnership, public or private association or corporation, or a governmental unit, public utility or any other legal entity whatsoever which is recognized by law as the subject of rights and duties.

Pipe - A culvert, closed conduit, or similar structure (including appurtenances) that conveys stormwater.

Planning Commission - The planning commission of The City of Harrisburg.

PMF (Probable Maximum Flood) - The flood that may be expected from the most severe combination of critical meteorological and hydrologic conditions that are reasonably possible in any area. The PMF is derived from the probable maximum precipitation (PMP) as determined on the basis of data obtained from the National Oceanographic and Atmospheric Administration (NOAA).

Point Source - Any discernible, confined, or discrete conveyance, including, but not limited to: any pipe, ditch, channel, tunnel, or conduit from which stormwater is or may be discharged, as defined in State regulations at 25 Pa. Code § 92.1.

Project Site - The specific area of land where any Earth Disturbance activities in the City are planned, conducted, or maintained.

Qualified Professional - A Professional Engineer licensed by the Pennsylvania Department of State, and other persons licensed or otherwise qualified by law to perform the work required by the Ordinance.

485
486 **Rational Formula** - A rainfall-runoff relation used to estimate peak flow.
487
488 **Redevelopment** - Earth disturbance activities on land, which has previously been disturbed or
489 developed.
490
491 **Regulated Activities** - Actions or proposed actions that impact upon proper management of stormwater
492 runoff and that are governed by this Ordinance as specified in 9-935 of this Ordinance.
493
494 **Release Rate** - The percentage of pre-development peak rate of runoff from a site or subwatershed area
495 to which the post-development peak rate of runoff must be reduced to protect downstream areas.
496
497 **Release Rate District** - Those subwatershed areas in which some type of detention is required to meet
498 the plan requirements and the goals of Act 167.
499
500 **Retention Basin** - An impoundment in which stormwater is stored and not released during the storm
501 event. Stored water may be released from the basin at some time after the end of the storm.
502
503 **Return Period** - The average interval, in years, within which a storm event of a given magnitude can be
504 expected to recur. For example, the 25-year return period rainfall would be expected to recur on the
505 average once every twenty-five years.
506
507 **Riser** - A vertical pipe extending from the bottom of a pond that is used to control the discharge rate
508 from the pond for a specified design storm.
509
510 **Road Maintenance** - Earth disturbance activities within the existing road cross-section, such as grading
511 and repairing existing unpaved road surfaces, cutting road banks, cleaning or clearing drainage ditches,
512 and other similar activities.
513
514 **Rooftop Detention** - Temporary ponding and gradual release of stormwater falling directly onto flat
515 roof surfaces by incorporating controlled-flow roof drains into building designs.
516
517 **Runoff** - Any part of precipitation that flows over the land surface.
518
519 **Runoff Capture Volume** - The volume of runoff that is captured (retained) and not released into surface
520 waters of the Commonwealth during or after a storm event.
521
522 **Sediment Basin** - A barrier, dam, retention or detention basin located and designed to retain rock, sand,
523 gravel, silt, or other material transported by water.
524
525 **Sediment Pollution** - The placement, discharge or any other introduction of sediment into the waters of
526 the Commonwealth occurring from the failure to design, construct, implement or maintain control
527 measures and control facilities in accordance with the requirements of this Ordinance.
528
529 **Sedimentation** - The process by which mineral or organic matter is accumulated or deposited by the
530 movement of water.
531
532 **Seepage Pit/Seepage Trench** - An area of excavated earth filled with loose stone or similar coarse
533 material, into which surface water is directed for infiltration into the ground.
534

535 **Separate Storm Sewer System** - A conveyance or system of conveyances (including roads with
536 drainage systems, City streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains)
537 primarily used for collecting and conveying stormwater runoff.
538

539 **Sheet Flow** - Runoff that flows over the ground surface as a thin, even layer, not concentrated in a
540 channel.
541

542 **Soil-Cover Complex Method** - A method of runoff computation developed by the NRCS that is based
543 on relating soil type and land use/cover to a runoff parameter called Curve Number (CN).
544

545 **Spillway (emergency)** - A depression in the embankment of a pond or basin that is used to pass peak
546 discharge greater than the maximum design storm controlled by the pond.
547

548 **State Water Quality Requirements** - As defined under state regulations -- protection of *designated* and
549 *existing* uses (See 25 Pa. Code Chapters 93 and 96)--including:
550

- 551 (1) Each stream segment in Pennsylvania has a "designated use," such as "cold water fishery" or
552 "potable water supply," which are listed in Chapter 93. These uses must be protected and
553 maintained, under state regulations.
554
- 555 (2) "Existing uses" are those attained as of November 1975, regardless whether they have been
556 designated in Chapter 93. Earth Disturbance activities must be designed to protect and maintain
557 existing uses and maintain the level of water quality necessary to protect those uses in all
558 streams, and to protect and maintain water quality in special protection streams.
559
- 560 (3) Water quality involves the chemical, biological, and physical characteristics of surface water
561 bodies. After Earth Disturbance activities are complete, these characteristics can be impacted by
562 addition of pollutants such as sediment, and changes in habitat through increased flow volumes
563 and/or rates as a result of changes in land surface area from those activities. Therefore,
564 permanent discharges to surface waters must be managed to protect the stream bank, streambed,
565 and structural integrity of the waterway, to prevent these impacts.
566
- 567 (4) Protection and maintenance of water quality in special protection streams pursuant to 25 Pa.Code
568 Chapter 93.
569

570 **Storage Indication Method** - A reservoir routing procedure based on solution of the continuity equation
571 (inflow minus outflow equals the change in storage) with outflow defined as a function of storage
572 volume and depth.
573

574 **Storm Frequency** - The number of times that a given storm "event" occurs or is exceeded on the
575 average in a stated period of years. See "Return Period".
576

577 **Storm Sewer** - A system of pipes and/or open channels that convey intercepted runoff and stormwater
578 from other sources, but excludes domestic sewage and industrial wastes.
579

580 **Stormwater** - The surface runoff generated by precipitation reaching the ground surface.
581

582 **Stormwater Hotspot** - A stormwater hotspot is defined as a land use or activity that generates higher
583 concentrations of hydrocarbons, trace metals, or toxicants than are found in typical stormwater runoff,
584 based on monitoring studies.

585
586 **Stormwater Management Facilities** - Any structure, natural or man-made, that, due to its condition,
587 design, or construction, conveys, stores, or otherwise affects stormwater runoff. Typical stormwater
588 management facilities include, but are not limited to, detention and retention basins, open channels,
589 storm sewers, pipes and infiltration structures.
590
591 **Stormwater Management Plan** - The plan for managing stormwater runoff in the Spring Creek and
592 Paxton Creek Watershed adopted by Dauphin County as required by the Act of October 4, 1978, P.L.
593 864, (Act 167) and known as the "Spring Creek Watershed Act 167 Stormwater Management Plan Phase
594 II Update" or "Paxton Creek Watershed Act 167 Stormwater Management Plan Phase II Update".
595
596 **Stream Enclosure** - A bridge, culvert, or other structure in excess of 100 feet in length upstream to
597 downstream which encloses a regulated water of this Commonwealth.
598
599 **Subwatershed Area** - The smallest drainage unit of a watershed for which stormwater management
600 criteria have been established in the Stormwater Management Plan.
601
602 **Subdivision** - The division or re-division of a lot, tract, or parcel of land by any means into two or more
603 lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose,
604 whether immediate or future, of lease, transfer of ownership, or building or lot development: Provided,
605 however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten
606 acres, not involving any new street or easement of access or any residential dwellings, shall be exempt.
607
608 **Surface Waters of the Commonwealth** - Any and all rivers, streams, creeks, rivulets, impoundments,
609 ditches, watercourses, storm sewers, lakes, dammed water, wetlands, ponds, springs, and all other bodies
610 or channels of conveyance of surface water, or parts thereof, whether natural or artificial, within or on
611 the boundaries of the Commonwealth.
612
613 **Swale** - A low-lying stretch of land that gathers or carries surface water runoff.
614
615 **Timber Operations** - See "Forest Management".
616
617 **Time of Concentration (T_c)** - The time for surface runoff to travel from the hydraulically most distant
618 point of the watershed to a point of interest within the watershed. This time is the combined total of
619 overland flow time and flow time in pipes or channels, if any.
620
621 **Watercourse** - A channel or conveyance of surface water, such as a stream or creek, having defined bed
622 and banks, whether natural or artificial, with perennial or intermittent flow.
623
624 **Watershed** - Region or area drained by a river, watercourse, or other body of water, whether natural or
625 artificial.
626
627 **Wetland** - Those areas that are inundated or saturated by surface or ground water at a frequency and
628 duration sufficient to support, and that under normal circumstances do support, a prevalence of
629 vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs and
630 similar areas. (The term includes but is not limited to wetland areas listed in the State Water Plan, the
631 United States Forest Service Wetlands Inventory of Pennsylvania, the Pennsylvania Coastal Zone
632 Management Plan and a wetland area designated by a river basin commission. This definition is used by
633 the United States Environmental Protection Agency and the United States Army Corps of Engineers.)

ARTICLE III – STORMWATER MANAGEMENT

9-906 General Requirements

- (a) All Regulated Activities in the Spring Creek and Paxton Creek Watershed, which are not granted an exemption in accordance with the provisions of this Ordinance, shall submit a Drainage Plan consistent with the Spring Creek and Paxton Creek Watershed Stormwater Management Plan to the City for review. These criteria shall apply to the total proposed development even if development is to take place in stages. Impervious cover shall include, but not be limited to: additional indoor living space, decks, patios, garages, storage sheds and similar structures, roofs, parking or driveway areas, and any new streets and sidewalks. Any areas designed to initially be gravel or crushed stone shall be assumed to be impervious.
- (b) All Regulated Activities within the City shall be designed, implemented, operated, and maintained to meet the purposes of this Ordinance, through these three elements:
- (1) Erosion and sediment control during the earth disturbance activities (e.g., during construction),
 - (2) Water quality protection measures after completion of earth disturbance activities (e.g., post- construction), including operations and maintenance, and
 - (3) Drainage and Stormwater Management
- (c) No Earth Disturbance activities associated with any Regulated Activities shall commence until approval by the City of a plan, which demonstrates compliance with the requirements of this Ordinance.
- (d) All BMPs used to meet the requirements of this Ordinance shall be designed, installed, operated, and maintained to conform to the State Water Quality Requirements, the requirements of the Clean Streams Law and implementing regulations, and any more stringent requirements as determined by the City.
- (e) Stormwater drainage systems shall be provided in order to permit unimpeded flow along natural watercourses, except as modified by stormwater management facilities or open channels consistent with this Ordinance.
- (f) The existing points of concentrated drainage that discharge onto adjacent property shall not be altered without permission of the altered property owner(s) and shall be subject to any applicable discharge criteria specified in this Ordinance.
- (g) Areas of existing diffused drainage discharge shall be subject to any applicable discharge criteria in the general direction of existing discharge, whether proposed to be concentrated or maintained as diffused drainage areas, except as otherwise provided by this Ordinance. If diffused flow is proposed to be concentrated and discharged onto adjacent property, the Developer must document that adequate downstream conveyance facilities exist to safely transport the concentrated discharge, or otherwise prove that no erosion, sedimentation, flooding, or other harm will result from the concentrated discharge.

- 683 (h) Where watercourses traverse a development site, drainage easements shall be provided
684 conforming to the line of such watercourses. The terms of the easement shall prohibit
685 excavation, the placing of fill or structures, and any alterations that may adversely affect the flow
686 of stormwater within any portion of the easement. Also, maintenance, including mowing of
687 vegetation within the easement shall be required, except as approved by the appropriate
688 governing authority.
689
- 690 (i) When it can be shown that, due to topographic conditions, natural drainageways on the site
691 cannot adequately provide for drainage, open channels may be constructed conforming
692 substantially to the line and grade of such natural drainage ways. Work within natural drainage
693 ways shall be subject to approval by DEP under regulations at 25 Pa. Code Chapter 105 through
694 the Joint Permit Application process, or where deemed appropriate by DEP, through the General
695 Permit process.
696
- 697 (j) Any stormwater management facilities regulated by this Ordinance that would be located in or
698 adjacent to waters of the Commonwealth or wetlands shall be subject to approval by DEP under
699 regulations at 25 Pa. Code Chapter 105 through the Joint Permit Application process, or where
700 deemed appropriate by DEP, the General Permit process. When there is a question whether
701 wetlands may be involved, it is the responsibility of the Developer or his agent to show that the
702 land in question cannot be classified as wetlands; otherwise, approval to work in the area must
703 be obtained from DEP.
704
- 705 (k) Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the
706 tributary area and any facility which may constitute a dam subject to permit by DEP under
707 regulations at 25 Pa. Code Chapter 105.
- 708 (l) All Earth Disturbance activities are subject to permit requirements by DEP under regulations at
709 25 Pa. Code Chapter 102.
710
- 711 (m) Any stormwater management facilities regulated by this Ordinance that would be located on
712 State highway rights-of-way shall be subject to approval by the Pennsylvania Department of
713 Transportation (PENNDOT).
714
- 715 (n) Minimization of impervious surfaces and infiltration of runoff through seepage beds, infiltration
716 trenches, etc. are encouraged, where soil conditions permit, to reduce the size or eliminate the
717 need for detention facilities.
718
- 719 (o) Roof drains shall not be connected to streets, sanitary or storm sewers, or roadside ditches in
720 order to promote overload flow and infiltration/percolation of stormwater where advantageous to
721 do so. When it is more advantageous to connect directly to streets or storm sewers, then the City
722 shall permit it on a case-by-case basis.
723
- 724 (p) Developers are encouraged to incorporate designs to take advantage of the stormwater credits
725 presented in Appendix E of the Spring Creek and Paxton Creek Act 167 Stormwater
726 Management Plan.
727
- 728 (q) Special Conditions for Areas Falling within Defined Exceptional Value and High Quality Sub-
729 Watersheds – The temperature and quality of water and streams that have been declared as
730 exceptional value and high quality is to be maintained as defined in Chapter 93, Water Quality
731 Standards, Title 25 of Pennsylvania Department of Environmental Protection Rules and

Regulations. Temperature sensitive BMPs and stormwater conveyance systems are to be used and designed with storage pool areas and supply outflow channels and should be shaded with trees. This will require modification of berms for permanent ponds and relaxation of restrictions on planting vegetation within the facilities, provided the capacity for volumes and rate controls is maintained. At a minimum, the southern half on pond shorelines will be planted with shade or canopy trees within ten (10) feet of the pond shoreline. In conjunction with this requirement, the maximum slope allowed on the berm area to be planted is 10 to 1. This will lessen the destabilization of berm soils due to root growth. A long term maintenance schedule and management plan for the thermal control BMPs is to be established and recorded for all development sites.

- (r) Techniques described in Appendix B (Low Impact Development) of this Ordinance are encouraged because they reduce the costs of complying with the requirements of this Ordinance and the State Water Quality Requirements.
- (s) Infiltration for storm water management is encouraged where soils and geology permit, consistent with the provisions of this Ordinance and, where appropriate, infiltration is encouraged for capturing and treating the Water Quality Volume (as calculated in 9-907), any part of the Water Quality Volume or for otherwise meeting the purposes of this Ordinance.
- (t) The City may, after consultation with DEP, approve alternative methods for meeting the State Water Quality Requirements other than those in Article III, provided that they meet the minimum requirements of, and do not conflict with, State law including but not limited to the Clean Streams Law.
- (u) The Drainage Plan for all developments that create impervious surface or change the existing topography, except for exemptions provided in 9-907, shall demonstrate that adequate capacity will be provided to treat the "Runoff Capture Volume" and contain the "Water Quality Volume", as described under 9-907 of this ordinance.

9-907 Exemptions

- (a) Two exemptions (**Exemption 1 - Release Rates, Water Quality Volume, Channel Protection Volume, and Drainage Plan Submission** and **Exemption 2 - Groundwater Recharge**) from this Ordinance may be granted at the discretion of the City. The Applicant must demonstrate that the following BMPs are being utilized to the maximum extent practicable to receive consideration for the two exemptions:
 - (1) Design around and limit disturbance of Floodplains, Wetlands, and Natural Slopes over 15%, existing native vegetation, and other sensitive and special value features
 - (2) Clearly show limits of disturbance on construction plans
 - (3) Maintain riparian and forested buffers
 - (4) Limit grading and maintain non-erosive flow conditions in natural flow paths
 - (5) Maintain existing tree canopies near impervious areas
 - (6) Minimize soil disturbance and reclaim disturbed areas with top soil and vegetation
 - (7) Direct runoff to pervious areas
 - (8) Utilize "Stormwater Credits" found in Appendix E of the Spring Creek and Paxton Creek Act 167 Plan
 - (9) Utilize guidance listed in the Pennsylvania Stormwater Best Management Practices Manual

(A) **Exemption 1 - Release Rates, Water Quality Volume, Channel Protection Volume, & Drainage Plan Submission** – An exemption of these requirements contained within this Ordinance for all Regulated Activities within the City may be granted at the discretion of the City in accordance with the following:

An exemption of Release Rates, Water Quality Volume, Channel Protection Volume, & Drainage Plan Submission may be granted in accordance with Table 1 to determine the maximum additional impervious area (and associated minimum separation distance) that can be placed on a development site. This exemption shall be granted only if the City determines that proposed development/additional impervious area will not adversely impact the following:

- (i) Capacities of existing drainage ways and storm sewer systems
- (ii) Velocities and erosion
- (iii) Quality of runoff if direct discharge is proposed
- (iv) Existing known problem areas
- (v) Safe conveyance of the additional runoff
- (vi) Harm or property damage to downstream property owners

Development that is planned to occur in stages or phases will be considered in its entirety for the purposes of determining the exemption.

Table 1

Parcel Size * (acres)	Minimum Separation Distance - (feet)	Maximum Additional Impervious Area - Since The Date of Adoption of This Ordinance - (square feet)
0.5	10	2,700
1.0	50	4,600
1.5	100	6,200
2.0	125	7,600
2.5	150	9,000
3.0	175	10,300
3.5	200	11,500
4.0	225	12,700
4.5	250	13,800
5.0	275	15,000
> 5.0	300	15,000

* Parcel Size to be rounded to the nearest half-acre for the purpose of utilizing Table 1

(B) **Exemption 2 - Groundwater Recharge** – An exemption of this requirement for all Regulated Activities within the City may be granted at the discretion of the City in accordance with the following:

An exemption of Groundwater Recharge may be granted if the maximum additional impervious coverage is **2,000 square feet or less**. Development sites that generate greater than 2,000 square feet of new impervious cover are not eligible for this exemption. The 2,000 square foot maximum additional impervious cover applies to the

total amount of additional impervious cover to be placed on a development site whether the project is a single phase or will occur in multiple phases. It does not include existing impervious cover placed on a development site prior to the adoption of this Ordinance.

An exemption of Groundwater Recharge may be granted if the City, based upon data provided by the Applicant, determines that the Groundwater Recharge requirements are not suitable in the following areas.

- (i) High groundwater table
 - o (Need minimum of 3 ft from bed of infiltration facility to seasonal high groundwater elevation)
- (ii) Shallow depth to bedrock
 - o (Need minimum of 2 ft from bed of infiltration facility to top of bedrock)
- (iii) High risk of sinkhole development, to be determined on a case-by-case basis

(b) At the discretion of the City, the Applicant may be required to provide a detailed geotechnical evaluation.

(c) Under no circumstance shall the Applicant be exempt from implementing such measures as necessary to:

- (i) Meet State Water Quality Standards/Requirements
- (ii) Protect health, safety, and property
- (iii) Meet special requirements for High Quality (HQ) and Exceptional Value (EV) Watersheds.

9-908 Stormwater Management Districts

(a) The Spring Creek Watershed has been designated into six (6) release rate districts as shown (Plate 5). All areas within the districts are subject to the specified release rates. The 2-year, 10-year, and the 25-year design storms are all subject to specified release rates. The Paxton Creek Watershed has been designated into forty-five (45) subwatersheds as shown on Page 6 of this ordinance (Plate 6 in the Plan). All areas within the districts are subject to the specified release rates. The 2-year, 10-year, and 25-year design storms are all subject to the specified release rates.

(b) Any areas not shown on the release rate maps, the post-development discharge rates shall not exceed the predevelopment discharge rates.

(c) If the developer can show that the post-development hydrograph matches the pre-development hydrograph for peak flows and volume, for all design storms, release rates, as described in 9-908(a) are not required.

9-909 Stormwater Management District Implementation Provisions

(a) Off-Site Areas - Off-site areas that drain through a proposed development site are not subject to release rate criteria when determining allowable peak runoff rates. However, on-site drainage facilities shall be designed to safely convey off-site flows through the development site.

(b) "No Harm" Option - For any proposed development site, the developer has the option of using a less restrictive runoff control (including no detention), if the developer can prove that "no harm" would be caused by discharging at a higher runoff rate than existing conditions. The "no harm" option is used when a developer can prove that the post-development hydrographs can match pre-development hydrographs, or if it can be proven that the post-development conditions will not cause increases in peaks at all points downstream. Proof of "no harm" would have to be shown based upon a "Downstream Impact Evaluation" which shall include a "Downstream Hydraulic Capacity Analysis" consistent with 9-909(c) to determine if adequate hydraulic capacity exists. The developer shall submit this evaluation of the impacts due to increased downstream stormwater flows in the watershed to the City.

(1) The "Downstream Impact Evaluation" shall include hydrologic and hydraulic calculations necessary to determine the impact of hydrograph timing modifications due to the proposed development upon a dam, highway, structure, natural point of restricted stream flow, or any stream channel section, established with the concurrence of the City.

(2) The evaluation shall continue downstream until the increase in flow diminishes due to additional flow from tributaries and/or stream attenuation.

(3) The peak flow values to be used for downstream areas for the design return period storms (2-year, 10-year, and 25-year) shall be the values from the calibrated model for the Spring Creek and Paxton Creek watershed. These flow values can be obtained from the watershed plan.

(4) Developer-proposed runoff controls which would generate increased peak flow rates at storm drainage problem areas would, by definition, be precluded from successful attempts to prove "no harm", except in conjunction with proposed capacity improvements for the problem areas consistent with 9-909(c).

(5) A financial distress shall not constitute grounds for granting a "no harm" exemption.

(6) Capacity improvements may be provided as necessary to implement the "no harm" option, which proposes specific capacity improvements to demonstrate that a less stringent discharge control would not create any harm downstream.

(7) Any "no harm" justifications shall be submitted by the Developer as part of the Drainage Plan submission per Article IV.

(c) "Downstream Hydraulic Capacity Analysis" - Any downstream capacity hydraulic analysis conducted in accordance with this Ordinance shall use the following criteria for determining adequacy for accepting increased peak flow rates:

(1) Natural or man-made channels or swales must be able to convey the increased runoff associated with a 2-year return period event within their banks at velocities consistent with protection of the channels from erosion. Acceptable velocities shall be based upon criteria included in the DEP *Erosion and Sediment Pollution Control Program Manual*.

(2) Natural or man-made channels or swales must be able to convey the increased 25-year return period runoff without creating any hazard to persons or property.

- (3) Culverts, bridges, storm sewers, or any other facilities which must pass or convey flows from the tributary area must be designed in accordance with DEP, Chapter 105 regulations (if applicable) and, at a minimum, pass the increased 25-year return period runoff.

- (d) Regional Detention Alternatives - For certain areas within the watershed, it may be more cost-effective to provide one control facility for more than one development site than to provide an individual control facility for each development site. The initiative and funding for any regional runoff control alternatives are the responsibility of prospective developers. The design of any regional control basins must incorporate reasonable development of the entire upstream watershed. The peak outflow of a regional basin would be determined on a case-by-case basis using the hydrologic model of the watershed consistent with protection of the downstream watershed areas. "Hydrologic model" refers to the calibrated model as developed for the Stormwater Management Plan.

9-910 Design Criteria for Stormwater Management Facilities

- (a) Any stormwater management facility (i.e. detention basin) designed to store runoff and requiring a berm or earthen embankment, required or regulated by this Ordinance, shall be designed to provide an emergency spillway to handle flow up to and including the 100-year post-development conditions. The height of embankment must be set as to provide a minimum 1-foot of freeboard above the maximum pool elevation computed when the facility functions for the 100-year post-development inflow. Soils used for the construction of basins shall have low-erodibility factors ("K" factors). Should any stormwater management facility require a dam safety permit under DEP Chapter 105, the facility shall be designed in accordance with Chapter 105 and meet the regulations of Chapter 105 concerning dam safety which may be required to pass storms larger than 100-year event.
- (b) Any facilities that constitute water obstructions (e.g., culverts, bridges, outfalls, or stream enclosures) and any work involving wetlands as directed in DEP Chapter 105 regulations (as amended or replaced from time to time by DEP) shall be designed in accordance with Chapter 105 and will require a permit from DEP. Any water obstruction that does not fall under Chapter 105 regulations must be able to convey, without damage to the drainage structure or roadway, runoff from the 25-year design storm with a minimum 1-foot of freeboard measured below the lowest point along the top of the roadway. Any facility that constitutes a dam as defined in DEP Chapter 105 regulations may require a permit under dam safety regulations. Any facility located within a PENNDOT right-of-way must meet PENNDOT minimum design standards and permit submission requirements.
- (c) Storm sewers and manmade channels (i.e. swales) must be able to convey post-development runoff from a 10-year design storm without surcharging inlets where appropriate. When connecting to an existing storm sewer system, the Applicant must demonstrate that the proposed system will not exacerbate any existing stormwater problems.
- (d) Adequate erosion protection shall be provided along all open channels and at all points of discharge.
- (e) The design of all stormwater management facilities shall incorporate sound engineering principles and practices. The City shall reserve the right to disapprove any design that would

result in the occupancy or continuation of an adverse hydrologic or hydraulic condition within the watershed.

9-911 Calculation Methodology

(a) Stormwater runoff from all development sites shall be calculated using either the Rational Method or a Soil-Cover-Complex methodology.

- (1) Any stormwater runoff calculations involving drainage areas greater than 20 acres, including on-and off-site areas, shall use a generally accepted calculation technique that is based on the NRCS soil cover complex method. Table 2 summarizes acceptable computation methods. It is assumed that all methods will be selected by the design professional based on the individual limitations and suitability of each method for a particular site.

The City may approve the use of the Rational Method to estimate peak discharges from drainage areas that contain less than 20 acres.

- (2) The design storm volumes to be used in the analysis of peak rates of discharge may be obtained from the Precipitation-Frequency Atlas of the United States, Atlas 14, Volume 2, US Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, Hydrometeorological Design Studies Center, Silver Spring, Maryland (2004). NOAA's Atlas 14 can be accessed at Internet address: <http://hdsc.nws.noaa.gov/hdsc/pfds/>.

- (3) All calculations consistent with this Ordinance using the Soil Cover Complex Method shall use the appropriate design rainfall depths for the various return period storms presented in Table A-1 in Appendix A of this Ordinance if Atlas 14 is not used. If a hydrologic computer model is used for stormwater runoff calculations, then the duration of rainfall shall be 24-hour along with a Soil Conservation Service Type II rainfall distribution.

- (4) For the purposes of pre-development flow rate determination, undeveloped land shall be considered as "meadow" good condition or "range" unless the natural ground cover generates a lower curve number or Rational 'C' value (i.e. forest).

- (5) All calculations using the Rational Method shall use rainfall intensities consistent with appropriate times of concentration for overland flow and return periods from the Design Storm Curves from PA Department of Transportation Design Rainfall Curves (1986). Times of concentration for overland flow shall be calculated using the methodology presented in Chapter 3 of Urban Hydrology for Small Watersheds, NRCS, TR-55 (as amended or replaced from time to time by NRCS). Times of concentration for channel and pipe flow shall be computed using Manning's equation.

- (6) For undeveloped areas, times of concentration may be computed using the SCS equation for Lag Time (T_{LAG}).

$$\text{Time of Concentration} = T_C = \frac{T_{LAG}}{0.6} * 60 \quad (\text{in minutes})$$

$$T_{lag} = L^{0.8} \frac{(S+1)^{0.7}}{1900\sqrt{Y}}$$

Where:

T_{log} = Lag time in hours

L = Hydraulic length of watershed in feet.

Y = Average overland slope of watershed in percent.

S = Maximum retention in watershed as defined by:

$$S = \frac{1000}{CN} - 10$$

CN = SCS Curve Number for watershed as defined by the SCS Loss Method.

- (7) Runoff Curve Numbers (CN) for both existing and proposed conditions to be used in the soil cover complex method shall be obtained from Table A-2 in Appendix A of this Ordinance.
- (8) Runoff coefficients (C) for both existing and proposed conditions for use in the Rational Method shall be obtained from Table A-3 in Appendix A of this Ordinance.
- (9) Where uniform flow is anticipated, the Manning equation shall be used for hydraulic computations and to determine the capacity of open channels, pipes, and storm sewers. Values for Manning's roughness coefficient "n" shall be consistent with Table A-4 in Appendix A of the Ordinance. Manning's equation should not be used for analysis of pipes under pressure flow or for analysis of culverts.
- (10) The design of any stormwater detention facilities intended to meet the performance standards of this Ordinance shall be verified by routing the design storm hydrograph through these facilities using the Storage-Indication Method. For drainage areas greater than 20 acres in size, the design storm hydrograph shall be computed using a calculation method that produces a full hydrograph.
- The City may approve the use of any generally accepted full hydrograph approximation technique that shall use a total runoff volume that is consistent with the volume from a method that produces a full hydrograph.
- (11) The City has the authority to require that computed existing runoff rates be reconciled with field observations and conditions. If the designer can substantiate through actual physical calibration that more appropriate runoff and time of concentration values should be utilized at a particular site, then appropriate variations may be made upon review and recommendations of the City. Calibration shall require detailed gauge and rainfall data for the particular site in question.
- (12) Outlet structures for stormwater management facilities shall be designed to meet the performance standards of this Ordinance using any generally accepted hydraulic analysis technique or method.

**TABLE 2 - ACCEPTABLE COMPUTATION METHODOLOGIES
FOR STORMWATER MANAGEMENT PLANS**

METHOD	METHOD DEVELOPED BY	APPLICABILITY
TR-20 or Commercial Package Based on TR-20	USDA - NRCS	When use of full model is desirable or necessary
TR-55 Or Commercial Package Based on TR-55	USDA - NRCS	Applicable for plans within the models limitations
HEC - HMS	U.S. Army Corps of Engineers	When full model is desirable or

		necessary
PSRM	Penn State University	When full model is desirable or necessary
Rational Method or Commercial Package based on Rational Method	Emil Kuiching (1889)	For sites less than 20-acres
Other Methods	Various	As approved by the City

Successors to the above methods also are acceptable. Such successors include HEC-HMS for HEC-1, WinTR55 for TR-55 and WinTR20 for TR-20.

9-912 Erosion and Sedimentation Requirements during Earth Disturbance Activities

- (a) No Earth Disturbance activities within the City shall commence until approval by the Dauphin County Conservation District of an Erosion and Sediment Control Plan for construction activities.
- (b) When five thousand (5,000) square feet or more of earth disturbance activities are proposed, an Erosion and Sedimentation Control Plan must be submitted to the Dauphin County Conservation District and the City under 25 Pa. Code § 102.4(b). In addition, a letter from the Dauphin County Conservation District approving the Erosion and Sedimentation Control Plan must be obtained.
- (c) DEP has regulations; under 25 Pa. Code Chapter 92 that a DEP "NPDES Construction Activities" permit is required and must be obtained from the Dauphin County Conservation District and/or PA Department of Environmental Protection for Earth Disturbance activities.
- (d) Evidence of any necessary permit(s) for Earth Disturbance activities from the South-central regional DEP office or Dauphin County Conservation District must be provided to the City.
- (e) A copy of the Erosion and Sediment Control Plan and any other permit, as required by DEP regulations, shall be available at the project site at all times.
- (f) Additional erosion and sedimentation control design standards and criteria that must be or are recommended to be applied where infiltration BMPs are proposed and include the following:
 - (i) Areas proposed for infiltration BMPs shall be protected from sedimentation and compaction during the construction phase so as to maintain their maximum infiltration capacity.
 - (ii) Infiltration BMPs shall be protected from receiving sediment-laden runoff.

9-913 Water Quality Requirements after Earth Disturbance Activities Are Complete

- (a) No Earth Disturbance activities within the City shall commence, until approval by the City, of a plan, which demonstrates compliance with State Water Quality Requirements, after construction is complete.
- (b) The BMPs must be designed, implemented, and maintained to meet State Water Quality Requirements, and any other more stringent requirements as determined by the City.

(c) To control post-construction stormwater impacts from Earth Disturbance activities, State Water Quality Requirements can be met by a variety of BMPs, including site design, which provide for replication of pre-construction stormwater infiltration and runoff conditions, so that post-construction stormwater discharges do not degrade the physical, chemical, or biological characteristics of the receiving waters. As described in the DEP Comprehensive Stormwater Management Policy (#392-0300-002, September 28, 2002), this may be achieved by the following:

- (i) Ground Water Recharge/Infiltration: replication of pre-construction stormwater infiltration conditions,
- (ii) Water Quality Treatment: use of water quality treatment BMPs to ensure filtering out of the chemical and physical pollutants from the stormwater runoff, and
- (iii) Stream bank and Streambed Protection: management of volume and rate of post-construction stormwater discharges to prevent physical degradation of receiving waters (e.g., from scouring).

(d) DEP has regulations that require the City to ensure design, implementation, and maintenance of BMPs that control runoff from new development and redevelopment after Earth Disturbance activities are complete. These requirements include the need to implement post-construction stormwater BMPs with assurance of long-term operations and maintenance of those BMPs.

(e) Evidence of any necessary permit(s) for Earth Disturbance activities from the South-central DEP regional office must be provided to the City.

9-914 Ground Water Recharge (Infiltration/Recharge/Retention)

(a) The ability to retain and maximize the ground water recharge capacity of the area being developed or redeveloped is encouraged. Design of the infiltration/recharge stormwater management facilities shall give consideration to providing ground water recharge to compensate for the reduction in the percolation that occurs when the ground surface is paved and roofed over. These measures are encouraged, particularly in hydrologic soil groups A and B, and shall be utilized wherever feasible.

(b) The criteria for maintaining recharge is based on the USDA average annual recharge volume per soil type divided by the annual rainfall in Dauphin County (41 inches per year) and multiplied by 90%. This keeps the recharge calculation consistent with the WQ_v methodology. Thus, an annual recharge volume requirement shall be specified for a site as follows:

Percent Volume Method

$$Re_v = [(S)(R_v)(A)]/12$$

Where: Re_v = Ground Water Recharge Volume (ac-ft)
 S = Soil Specific Recharge Factor
 $R_v = 0.05 + 0.009(I)$
 I = Percent Impervious Cover

(i.e. use I=20 when there is 20% impervious cover)
A = Site Area (acres)

Percent Area Method

$$Re_v = (S)(A_i)$$

Where: Re_v = Ground Water Recharge Volume (ac-ft)
S = Soil Specific Recharge Factor
 A_i = Measured Impervious Cover (acres)

<u>Hydrologic Soil Group</u>	<u>Soil Specific Recharge Factor (S)</u>
A	0.39
B	0.26
C	0.14
D	0.07

The recharge volume is considered part of the total WQ_v that must be provided at a site and can be achieved either by a structural practice (e.g., infiltration, bioretention), a non-structural practice (e.g., buffers, disconnection of rooftops) or a combination of both.

Drainage areas having no impervious cover and no proposed disturbance during development may be excluded from the Re_v calculations. Designers are encouraged to use these areas as non-structural practices for Re_v Treatment.

Note: Re_v and WQ_v are inclusive. When treated separately, the Re_v may be subtracted from the WQ_v when sizing the water quality BMP.

(c) **Basis for Determining Recharge Volume**

- (1) Developers are encouraged to incorporate designs to take advantage of the storm water credits presented in Appendix E of the Spring Creek and Paxton Creek Act 167 Stormwater Management Plan.
- (2) If more than one HSG is present at a site, a composite soil-specific recharge factor shall be computed based on the proportion of total site area within each HSG. The recharge volume provided at the site shall be directed to the most permeable HSG available.
- (3) The "Percent Volume" method is used to determine the Re_v Treatment requirement when structural practices are used to provide recharge. These practices must provide see page into the ground and may include infiltration and exfiltration structures (e.g., infiltration bioretention, dry swales or sand filters with storage below the under drain). Structures that require impermeable liners, intercept groundwater or are designed for trapping sediment (e.g., forbays) may not be used. In this method, the volume of runoff treated by structural practices shall meet or exceed the computed recharge volume.
- (4) The "Percent Area" method is used to determine the Re_v Treatment requirements when non-structural practices are used. Under this method, the recharge requirements are evaluated by mapping the percent of impervious area that is effectively treated by an

acceptable non-structural practice and comparing it to the minimum recharge requirements.

(5) Acceptable non-structural practices include filter strips that treat rooftop or parking lot runoff, sheet flow discharge to stream buffers, and grass channels that treat roadway runoff.

(6) The recharge volume criterion does not apply to any portion of a site designated as a stormwater hotspot or any project considered as redevelopment. In addition, the City may alter or eliminate the recharge volume requirement if the site is situated on unsuitable soils (e.g., marine clays, karst or in an urban redevelopment area). In this situation, non-structural practices (Percent Area Method) shall be implemented to the maximum extent practicable and the remaining or untreated Re_v included in the WQ_v treatment.

(7) If Re_v is treated by structural or non-structural practices separate and upstream of the WQ_v treatment, the WQ_v is adjusted accordingly.

(d) Soils Evaluation

(1) A detailed soils evaluation of the project site shall be performed to determine the suitability of recharge facilities. The evaluation shall be performed by a qualified professional and, at a minimum, address soil permeability, depth to bedrock, susceptibility to sinkhole formation, subgrade stability, hydrologic soil groups and natural and manmade features.

(2) Extreme caution shall be exercised where infiltration is proposed in geologically susceptible areas such as strip mine or limestone areas. Extreme caution shall also be exercised where salt or chloride would be a pollutant since soils do little to filter this pollutant and it may contaminate the groundwater. It is also extremely important that the design professional evaluate the possibility of groundwater contamination from the proposed infiltration/recharge facility and recommend a hydrogeologic justification study be performed if necessary. Whenever a basin will be located in an area underlain by limestone, a geological evaluation of the proposed location shall be conducted to determine susceptibility to sinkhole formations. The design of all facilities over limestone formations shall include measures to prevent ground water contamination and, where necessary, sinkhole formation.

(3) The City may require the installation of an impermeable liner in detention basins. A detailed hydrogeologic investigation may be required by the City. The City shall require the developer to provide safeguards against groundwater contamination for uses that may cause groundwater contamination, should there be a mishap or spill.

(4) It shall be the developer's responsibility to verify if the site is underlain by limestone. The following note shall be attached to all Drainage Plans and signed and sealed by the developer's engineer/surveyor/landscape architect/geologist:

I, _____, certify that the proposed detention basin (circle one) is/is not underlain by limestone.

- 1247 (5) Where pervious pavement is permitted for parking lots, recreational facilities, non-
1248 dedicated streets or other areas, pavement construction specifications shall be noted on
1249 the plan.
1250
1251 (6) Recharge/infiltration facilities may be used in conjunction with other innovative or
1252 traditional BMPs, stormwater control facilities and nonstructural stormwater
1253 management alternatives.
1254
1255 (7) All recharge/infiltration facilities shall be designed to completely drain surface water
1256 within 48 hours from the end of the storm.
1257
1258 (8) Provide field test to determine appropriate percolation rate.
1259
1260 (9) Design infiltration structures for required storm volume based on field-determined
1261 capacity at the level of the proposed infiltration surface.
1262
1263 (10) Whenever a basin is proposed over an area underlain by limestone, the Drainage Plan
1264 shall include an evaluation of the susceptibility to sinkhole formation.
1265
1266 (11) The developer is responsible to provide adequate measures to protect the quality of
1267 water resources.
1268
1269 (12) When infiltration structures are used, the area where the structure is to be constructed
1270 and associated soils shall be protected from compaction.
1271

1272 **9-915 Water Quality Requirements**
1273

- 1274 (a) In addition to the performance standards and design criteria requirements of this Ordinance, the
1275 land developer shall comply with the following water quality requirements unless otherwise
1276 exempted by provisions of this Ordinance.
1277
1278 (b) For water quality, the objective is to provide adequate storage to capture and treat the runoff from
1279 90% of the average annual rainfall. P represents the depth of rain associated with 90% of the
1280 total rainfall events over 0.11 inches. Trace amounts of precipitation under 0.11 inches were
1281 disregarded to determine the 90% storm.
1282

- 1283 (1) The size of the water quality facility shall be based upon the following
1284 equation:
1285

1286
$$WQ_v = [(P) (R_v)(A)]/12$$

1287

1288 Where: WQ_v = Water Quality Volume (acre-feet)
1289 P = 1.1 inches of rainfall
1290 R_v = $0.05 + 0.009(I)$
1291 I = Percent Impervious Cover
1292 (i.e. use $I=20$ when there is 20% impervious cover)
1293 A = Site Area (acres)
1294

- (2) Treatment of the WQ_v shall be provided at all developments where stormwater management is required. A minimum WQ_v of 0.2 acre-inches shall be met at sites or in drainage areas that have less than 15% impervious cover.
- (3) Drainage areas having no impervious cover and no proposed disturbance during development may be excluded from the WQ_v calculations. Designers are encouraged to maximize the use of these areas as non-structural practices for WQ_v treatment.
- (4) The design of the facility shall consider and minimize the chances of clogging and sedimentation potential. Orifices smaller than 3 inches diameter are not recommended. However, if the Design Engineer can provide proof that the smaller orifices are protected from clogging by use of trash racks, etc., smaller orifices may be permitted.
- (5) Developers are encouraged to incorporate designs to take advantage of the stormwater credits presented in Appendix E of the Spring Creek and Paxton Creek Act 167 Stormwater Management Plan.

(c) To accomplish 9-914, the land developer may submit original and innovative designs to the City for review and approval. Such designs may achieve the water quality objectives through a combination of BMPs.

(d) In selecting the appropriate BMPs or combinations thereof, the land developer shall consider the following:

- (1) Total contributing area
- (2) Permeability and infiltration rate of the site soils
- (3) Slope and depth to bedrock
- (4) Seasonal high water table
- (5) Proximity to building foundations and wellheads
- (6) Erodibility of soils
- (7) Land availability and configuration of the topography

(e) The following additional factors should be considered when evaluating the suitability of BMPs used to control water quality at a given development site:

- (1) Peak discharge and required volume control
- (2) Stream bank erosion
- (3) Efficiency of the BMPs to mitigate potential water quality problems
- (4) The volume of runoff that will be effectively treated
- (5) The nature of the pollutant being removed
- (6) Maintenance requirements

9-916 Stream Bank Protection Requirements

(a) Stream bank protection shall be considered in implementing performance standards. If a stormwater storage facility needs to be constructed then, to protect channels from erosion, the outflow structure shall be designed to provide the 24-hour detention of the 1-year, 24-hour storm

event. The method for determining the Channel Protection Storage Volume (C_{pv}) requirement is detailed in Appendix D of this Ordinance.

(b) Basis for Determining Channel Protection Storage Volume, C_{pv} :

- (1) The models HEC-HMS, TR-55 and TR-20 (or an equivalent approved by the City) shall be used for determining peak discharge rates.
- (2) Rainfall depth for the 1-year, 24-hour storm event in Dauphin County is 2.5 inches.
- (3) Off-site areas shall be modeled as present land use in good condition for the 1-year storm event.
- (4) The length of overland flow used in time of concentration (t_c) calculations is limited to no more than 150-feet.
- (5) C_{pv} is not required at sites where the one-year post-development peak discharge (q_i) is less than or equal to 2.0 cfs. A C_{pv} orifice diameter (d_o) of less than 3 inches is subject to approval by the City and is not recommended unless an internal control for orifice protection is used.
- (6) C_{pv} shall be addressed for the entire site. If a site consists of multiple drainage areas, C_{pv} shall be computed and provided for each drainage area.
- (7) Extended detention storage provided for the C_{pv} does not meet the WQ_v requirement (i.e., C_{pv} and WQ_v shall be treated separately).
- (8) The stormwater storage needed for the C_{pv} may be provided above the WQ_v storage in stormwater ponds and wetlands, thereby meeting all storage criteria except Re_v in a single facility with appropriate hydraulic control structures for each storage requirement.
- (9) Infiltration is not recommended for C_{pv} control because of large storage requirements.

ARTICLE IV-DRAINAGE PLAN REQUIREMENTS

9-917 General Requirements

- (a) For any of the Regulated Activities by this Ordinance and not eligible for the exemptions provided in 9-907, the final approval of subdivision and/or land development plans, the issuance of any building or occupancy permit, or the commencement of any land disturbance activity may not proceed until the Property Owner or Developer or his/her agent has received written approval of a Drainage Plan from the City.

9-918 Drainage Plan Contents

- (a) The Drainage Plan shall consist of all applicable calculations, maps, and plans. A note on the maps shall refer to the associated computations and erosion and sedimentation control plan by title and date. The cover sheet of the computations and erosion and sedimentation control plan shall refer to the associated maps by title and date. All Drainage Plan materials shall be submitted to the City in a format that is clear, concise, legible, neat and well organized; otherwise, the Drainage Plan shall be disapproved and returned to the Applicant.

- 1397 (b) The following items shall be included in the Drainage Plan:
1398
1399 (1) General
1400
1401 (A) General description of project.
1402
1403 (B) The name, location and address of the property site; the name, address,
1404 and telephone number of the owner of the property; and the name, address,
1405 telephone number, and email address of the individual or firm
1406 preparing the Drainage Plan.
1407
1408 (C) General description of permanent stormwater management techniques,
1409 including: construction specifications of the materials to be used for
1410 stormwater management facilities, how each permanent stormwater BMP
1411 will be operated and maintained, and the identity of the person(s)
1412 responsible for operations and maintenance.
1413
1414 (D) Complete hydrologic, hydraulic and structural computations for all
1415 stormwater management facilities.
1416
1417 (2) Map(s) of the project area shall be submitted on 24-inch x 36-inch or 30-inch x 42-inch
1418 sheets and shall be prepared in a form that meets the requirements for recording in the
1419 offices of the Recorder of Deeds of Dauphin County. The contents of the maps(s) shall
1420 include, but not be limited to:
1421
1422 (A) The location of the project relative to highways, Cities or other
1423 identifiable land marks.
1424
1425 (B) Existing contours at intervals of two feet. In areas of steep slopes (greater
1426 than 15%), five-foot contour intervals may be used.
1427
1428 (C) Existing water bodies within the project area including streams, lakes,
1429 ponds, field delineated wetlands or other bodies of water.
1430
1431 (D) Other physical features including flood hazard boundaries, sinkholes,
1432 streams, existing drainage courses, areas of natural vegetation to be
1433 preserved and the total extent of the upstream area draining through the
1434 site.
1435
1436 (E) The locations of all existing and proposed utilities, sanitary sewers and
1437 water lines within 50 feet of property lines.
1438
1439 (F) An overlay showing soil names and boundaries.
1440
1441 (G) Proposed changes to the land surface and vegetative cover including the
1442 type and amount of impervious area that would be added.
1443
1444 (H) Proposed structures, roads, paved areas and buildings.
1445

- 1446 (I) Final contours at intervals of two feet. In areas of steep slopes (greater than
1447 an 15%), five-foot contour intervals may be used.
1448
- 1449 (J) The name of the development, the name and address of the owner of the
1450 property and the name of the individual or firm preparing the plan.
1451
- 1452 (K) The date of submission.
1453
- 1454 (L) A graphic and written scale of one inch equals no more than 50 feet; for tracts
1455 of 20 acres or more, the scale shall be one inch equals no more than
1456 100 feet.
1457
- 1458 (M) A North arrow.
1459
- 1460 (N) The total tract boundary and size with distances marked to the nearest foot
1461 and bearings to the nearest degree.
1462
- 1463 (O) Existing and proposed land use(s).
1464
- 1465 (P) A key map showing all existing man-made features beyond the property
1466 boundary that would be affected by the project.
1467
- 1468 (Q) Horizontal and vertical profiles of all open channels, including hydraulic
1469 capacity.
1470
- 1471 (R) Overland drainage paths.
1472
- 1473 (S) A 15-foot wide access easement around all stormwater management
1474 facilities that would provide ingress to and egress from a public right-of-
1475 way. The 15 feet shall extend from the top of bank of any channel or berm
1476 of any basin.
1477
- 1478 (T) A note on the plan indicating the location and responsibility for
1479 maintenance of stormwater management facilities that would be located
1480 off-site. All off-site facilities shall meet the performance standards and
1481 design criteria specified in this Ordinance.
1482
- 1483 (U) A construction detail of any improvements made to sinkholes and the
1484 location of all notes to be posted as specified in this Ordinance.
1485
- 1486 (V) Design details for stormwater infiltration, water quality, and
1487 detention/retention facilities including operation and maintenance
1488 requirements.
1489
- 1490 (W) A statement, signed by the landowner, acknowledging that the stormwater
1491 BMPs are fixtures that cannot be altered or removed without prior
1492 approval by the City.
1493
- 1494 (X) The location and clear identification of the nature of permanent stormwater
1495 BMPs.

(Y) The following signature block for the City:

The City of Harrisburg, on this date (date of signature), has reviewed and hereby certifies that the Drainage Plan meets all design standards and criteria of the Spring Creek and Paxton Creek Watershed Act 167 Stormwater Management Ordinance.

(Z) The location of all erosion and sedimentation control facilities.

(3) Supplemental Information

(A) A written description of the following information shall be submitted.

(i) The overall stormwater management concept for the project.

(ii) Stormwater runoff computations as specified in this Ordinance.

(iii) Stormwater management techniques to be applied both during and after development.

(iv) Expected project time schedule.

(B) A soil erosion and sedimentation control plan, where applicable, including all reviews and approvals as required by DEP.

(C) A geologic assessment of the effects of runoff on sinkholes as specified in this Ordinance.

(D) The effect of the project (in terms of runoff volumes and peak flows) on adjacent properties and on any existing City stormwater collection system that may receive runoff from the project site.

(E) A Highway Occupancy Permit from the PENNDOT District Office when utilization of a PENNDOT storm drainage system is proposed.

(4) Stormwater Management Facilities

(A) All stormwater management facilities must be located on a plan and described in detail.

(B) When groundwater recharge methods such as seepage pits, beds or trenches are used, the locations of existing and proposed septic tank infiltration areas and wells must be shown.

(C) All calculations, assumptions, and criteria used in the design of the stormwater management facilities must be shown.

1546 (a) For all Regulated Activities by this Ordinance, the steps below shall be followed for submission.
1547 For any activities that require a DEP Joint Permit Application and regulated under Chapter 105
1548 (Dam Safety and Waterway Management) or Chapter 106 (Floodplain Management) of DEP's
1549 Rules and Regulations, require a PENNDOT Highway Occupancy Permit, or require any other
1550 permit under applicable state or federal regulations, the permit(s) shall be part of the plan.
1551

1552 (1) The Developer as part of the Preliminary Plan submission shall submit the
1553 Drainage Plan for the Regulated Activity.
1554

1555 (2) Four (4) copies of the Drainage Plan shall be submitted.
1556

1557 (3) Distribution of the Drainage Plan will be as follows:
1558

1559 (i) Two (2) copies to the City accompanied by the requisite
1560 City Review Fee, as specified in this Ordinance
1561

1562 (ii) One (1) copy to the City
1563

1564 (iii) One (1) copy to the County Planning
1565 Commission/Department
1566

1567 **9-919 Drainage Plan Review**
1568

1569 (a) The City shall review the Drainage Plan for consistency with the purposes and requirements of
1570 this Ordinance. The City shall require receipt of a complete plan as specified in this
1571 Ordinance.
1572

1573 (b) The City shall review the Drainage Plan for any subdivision or land development against the
1574 City subdivision and land development ordinance provisions not superseded by this
1575 Ordinance.
1576

1577 (c) For Regulated Activities by this Ordinance, the City shall determine whether the Drainage Plan
1578 is consistent with the Stormwater Management Plan. Should the Drainage Plan be determined to
1579 be consistent with the Stormwater Management Plan, the City will forward an approval letter to
1580 the Developer.
1581

1582 (d) Should the Drainage Plan be determined to be inconsistent with the Stormwater Management
1583 Plan, the City will forward a disapproval letter to the Developer citing the reason(s) for the
1584 disapproval. Any disapproved Drainage Plans may be revised by the Developer and
1585 resubmitted consistent with this Ordinance.
1586

1587 (e) For Regulated Activities specified in 9-935 of this Ordinance, the City shall notify the City
1588 Building Permit Officer in writing, within a time frame consistent with the City Building Code
1589 and/or City Subdivision Ordinance, whether the Drainage Plan is consistent with the Stormwater
1590 Management Plan and forward a copy of the approval/disapproval letter to the Developer. Any
1591 disapproved rainage Plan may be revised by the Developer and resubmitted consistent with this
1592 Ordinance.
1593

1594 (f) For Regulated Activities requiring a DEP Joint Permit Application, the City may notify DEP
1595 whether the Drainage Plan is consistent with the Stormwater Management Plan and forward a

copy of the review letter to the City and the Developer. DEP may consider the City's review comments in determining whether to issue a permit.

- (g) The City shall not approve any subdivision or land development for Regulated Activities specified in 9-935 of this Ordinance if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan, as determined by the City. All required permits from DEP must be obtained prior to approval.
- (h) The City Building Permit Office shall not issue a building permit for any Regulated Activity specified in 9-935 of this Ordinance if the Drainage Plan has been found to be inconsistent with the Stormwater Management Plan, as determined by the City, or without considering the comments of the City. All required permits from DEP must be obtained prior to issuance of a building permit.
- (i) The Developer may be responsible for completing an "As-Built Survey" of all stormwater management facilities included in the approved Drainage Plan. The As-Built Survey and an explanation of any discrepancies with the design plans shall be submitted to the City for final approval. In no case shall the City approve the As-Built Survey until the City receives a copy of an approved Highway Occupancy Permit from the PENNDOT District Office and any applicable permits from DEP.
- (j) The City's approval of a Drainage Plan shall be valid for a period not to exceed three (3) years. This time period shall commence on the date that the City signs the approved Drainage Plan. If stormwater management facilities included in the approved Drainage Plan have not been constructed, or if an As-Built Survey of these facilities has not been approved within this time period, then the City may consider the Drainage Plan disapproved and may revoke any and all permits. Drainage Plans that are considered disapproved by the City shall be resubmitted in accordance with 9-921 of this Ordinance.

9-920 Modification of Plans

- (a) A modification to a submitted Drainage Plan for a development site that involves a change in stormwater management facilities or techniques, or that involves the relocation or re-design of stormwater management facilities, or that is necessary because soil or other conditions are not as stated on the Drainage Plan as determined by the City, shall require a resubmission of the modified Drainage Plan consistent with 9-918 of this Ordinance and be subject to review as specified in 9-919 of this Ordinance.
- (b) A modification to an already approved or disapproved Drainage Plan shall be submitted to the City accompanied by the applicable review fee. A modification to a Drainage Plan for which the City has not taken a formal action shall be submitted to the City, accompanied by the applicable City Review Fee.

9-921 Resubmission of Disapproved Drainage Plans

- (a) A disapproved Drainage Plan may be resubmitted; with the revisions addressing the City's concerns documented in writing, to the City in accordance with 9-918 of this Ordinance and be subject to review as specified in 9-919 of this Ordinance. The applicable City Review Fee must accompany a resubmission of a disapproved Drainage Plan.

ARTICLE V-INSPECTIONS

9-922 Schedule of Inspections

- (a) DEP or its designees (e.g., Dauphin County Conservation District) normally ensure compliance with any permits issued, including those for stormwater management. In addition to DEP compliance programs, the City or his City assignee may inspect all phases of the installation of the permanent stormwater management facilities.
- (b) During any stage of the Earth Disturbance activities, if the City determines that the permanent stormwater management facilities are not being installed in accordance with the approved Stormwater Management Plan, the City shall revoke any existing permits until a revised Drainage Plan is submitted and approved as specified in this Ordinance.

9-923 Right of Entry

- (a) Upon presentation of proper credentials, duly authorized representatives of the City may enter at reasonable times, upon any property within the City, to inspect the implementation, condition, or operations and maintenance of the stormwater BMPs in regard to any aspect governed by this Ordinance.
- (b) BMP owners and operators shall allow persons working on behalf of the City ready access to all parts of the premises for the purposes of determining compliance with this Ordinance.
- (c) Persons working on behalf of the City shall have the right to temporarily locate on any BMP in the City such devices, as are necessary, to conduct monitoring and/or sampling of the discharges from such BMP.
- (d) Unreasonable delay in allowing the City access to a BMP is a violation of this Article.

9-924 Stormwater Management Easements

- (a) Stormwater management easements are required for all areas used for off-site stormwater control, unless a waiver is granted by the City.
- (b) Stormwater management easements shall be provided by the property owner if necessary for: access for inspections and maintenance, or preservation of stormwater runoff conveyance, infiltration, and detention areas and other BMPs, by persons other than the property owner.

ARTICLE VI-PROHIBITIONS

9-925 Prohibited Discharges

- (a) No person in the City shall allow, or cause to allow, stormwater discharges into the City's separate storm sewer systems which are not composed entirely of stormwater, except as provided in 9-925(b) below, and discharges allowed under a state or federal permit.
- (b) Discharges, which may be allowed, based on a finding by the City that the discharge(s) do not significantly contribute to pollution to surface waters of the Commonwealth, are:

-Discharges from fire fighting activities	-Flows from riparian habitats and wetlands
-Potable water sources including dechlorinated water line and fire hydrant flushings	-Uncontaminated water from foundations or from footing drains
-Irrigation drainage	-Lawn watering
-Air conditioning condensate	-Dechlorinated swimming pool discharges
-Springs	-Uncontaminated groundwater
-Water from crawl space pumps	-Water from individual residential car washing
-Pavement wash waters where spills or leaks of toxic or hazardous materials have not occurred (unless all spill material has been removed) and where detergents are not used	-Routine external building washdown (which does not use detergents or other compounds)

- (c) In the event that the City determines that any of the discharges identified in 9-925(b), significantly contribute to pollution of waters of the Commonwealth, or is so notified by DEP, the City will notify the responsible person(s) to cease the discharge.
- (d) Upon notice provided by the City under 9-925(c), the discharger will have a reasonable time, as determined by the City, to cease the discharge consistent with the degree of pollution caused by the discharge.
- (e) Nothing in this Section shall affect a discharger's responsibilities under state law.

9-926 Prohibited Connections

- (a) The following connections are prohibited, except as provided in 9-925(b):
- (1) Any drain or conveyance, whether on the surface or subsurface, which allows any non-stormwater discharge including sewage, process wastewater, and wash water to enter the City's separate storm sewer system, and any connections to the storm drain system from indoor drains and sinks; and
 - (2) Any drain or conveyance connected from a commercial or industrial land use to the City's separate storm sewer system, which has not been documented in plans, maps, or equivalent records, and approved by the City.

1719 **9-927 Roof Drains**

1720

- 1721 (a) Roof drains and sump pumps shall discharge to infiltration areas or vegetative BMPs to the
1722 maximum extent practicable.

1723

1724 **9-928 Alteration of BMPs**

1725

- 1726 (a) No person shall modify, remove, fill, landscape, or alter any existing stormwater BMP, unless it
1727 is part of an approved maintenance program, without the written approval of the City.

1728

- 1729 (b) No person shall place any structure, fill, landscaping, or vegetation into a stormwater BMP or
1730 within a drainage easement which would limit or alter the functioning of the BMP without the
1731 written approval of the City.

ARTICLE VII-FEES AND EXPENSES

9-929 General

- (a) The fee required by this Ordinance is the City Review Fee. The City Review fee shall be established by the City to defray review costs incurred by the City. The Applicant shall pay all fees.

9-930 City Drainage Plan Review Fee

- (a) The City shall establish a Review Fee Schedule by the City Engineer based on the size of the Earth Disturbance Activity and based on the City's costs for reviewing Drainage Plan. The City shall periodically update the Review Fee Schedule to ensure that review costs are adequately reimbursed, and post the same annually with the Office of the City Clerk.

9-931 Expenses Covered by Fees

- (a) The fees required by this Ordinance shall at a minimum cover:
- (1) Administrative and Clerical Costs
 - (2) The review of the Drainage Plan by the City.
 - (3) Pre-construction meetings
 - (4) The inspection of stormwater management facilities/BMPs and drainage improvements during construction
 - (5) The final inspection upon completion of the stormwater management facilities/BMPs and drainage improvements presented in the Drainage Plan
 - (6) Any additional work required to enforce any permit provisions regulated by this Ordinance, correct violations and assure proper completion of stipulated remedial actions

9-932 Recording of Approved Drainage Plan and Related Agreements

- (a) The owner of any land upon which permanent BMPs will be placed, constructed, or implemented, as described in the Drainage Plan, shall record the following documents in the Office of the Recorder of Deeds for Dauphin County, within fifteen (15) days of approval of the Drainage Plan by the City:
- (1) The Drainage Plan, or a summary thereof,
 - (2) Operations and Maintenance Agreements under Article VIII, and
 - (3) Easements under 9-924.
- (b) The City may suspend or revoke any approvals granted for the project site upon discovery of the failure of the owner to comply with this Section.

ARTICLE VIII-MAINTENANCE RESPONSIBILITIES

9-933 Performance Guarantee

- (a) The Applicant should provide a financial guarantee to the City for the timely installation and proper construction of all stormwater management controls as required by the approved Drainage Plan and this Ordinance, equal to 110% of the full construction cost of the required controls.

9-934 Maintenance Responsibilities

- (a) The Drainage Plan for the development site shall contain an operation and maintenance plan prepared by the developer and approved by the City. The operation and maintenance plan shall outline required routine maintenance actions and schedules necessary to insure proper operation of the facilities.

- (b) The Drainage Plan for the development site shall establish responsibilities for the continuing operating and maintenance of all proposed stormwater control facilities, consistent with the following principals:

(1) If a development consists of structures or lots that are to be separately owned and in which streets, sewers, and other public improvements are to be dedicated to the City, stormwater control facilities/BMPs may also be dedicated to and maintained by the City.

(2) If a development site is to be maintained in a single ownership or if sewers and other public improvements are to be privately owned and maintained, then the ownership and maintenance of stormwater control facilities/BMPs shall be the responsibility of the owner or private management entity.

- (c) The governing body, upon recommendation of the City, shall make the final determination on the continuing maintenance responsibilities prior to final approval of the Drainage Plan. The governing body reserves the right to accept the ownership and operating responsibility for any or all of the stormwater management controls/BMPs.

- (d) It shall be unlawful to alter or remove any permanent stormwater BMP required by an approved Drainage Plan, or to allow the property to remain in a condition, which does not conform to an approved Drainage Plan, unless the City grants an exception in writing.

9-935 Maintenance Agreement for Privately Owned Stormwater Facilities

- (a) Prior to final approval of the site's Drainage Plan, the property owner shall sign and record a maintenance agreement covering all stormwater control facilities that are to be privately owned. Said agreement, designated as Appendix C, is attached and made part hereto.

- (b) Other items may be included in the agreement where determined necessary to guarantee the satisfactory operation and maintenance of all BMP facilities. The maintenance agreement shall be subject to the review and approval of the City Solicitor and/or governing body.

1831 **9-936 City Stormwater Maintenance Fund**

1832

1833 (a) If the City accepts stormwater BMPs for dedication, persons installing stormwater storage
1834 facilities shall be required to pay a specified amount to the City Stormwater Maintenance Fund to
1835 help defray costs of periodic inspections and maintenance expenses. The amount of the deposit
1836 shall be determined as follows:

1837

1838 (1) If the stormwater BMP is to be owned and maintained by the City, the deposit shall cover
1839 the estimated costs for maintenance and inspections for ten (10) years. The City will
1840 establish the estimated costs utilizing information submitted by the Applicant.

1841

1842 (2) If the stormwater BMP is to be privately owned and maintained, the deposit shall cover
1843 the cost of periodic inspections performed by the City for a period of ten (10) years, as
1844 estimated by the City. After that period of time, inspections will be performed at the
1845 expense of the City.

1846

1847 (b) If a stormwater storage facility is proposed that also serves as a recreation facility (e.g. ball field,
1848 lake), the City may reduce or waive the amount of the maintenance fund deposit based upon the
1849 value of the land for public recreation purposes.

1850

1851 (c) If at some future time a stormwater BMP (whether publicly or privately owned) is eliminated due
1852 to the installation of storm sewers or other storage facility, the unused portion of the maintenance
1853 fund deposit will be applied to the cost of abandoning the facility and connecting to the storm
1854 sewer system or other facility. Any amount of the deposit remaining after the costs of
1855 abandonment are paid will be returned to the Depositor.

1856

1857 **9-937 Post-Construction Maintenance Inspections**

1858

1859 (a) Basins should be inspected by the land owner/developer or responsible entity (including the City
1860 for dedicated facilities) on the following basis:

1861

1862 (1) Annually for the first five (5) years

1863 (2) Once every two (2) years thereafter

1864 (3) During or immediately after the cessation of a one-hundred (100) year or greater
1865 storm event.

1866

1867 (b) The entity conducting the inspection should be required to submit a report to the City regarding
1868 the condition of the facility and recommending necessary repairs, if needed.

1869

ARTICLE IX-ENFORCEMENT AND PENALTIES

9-938 Right-of-Entry

- (a) Upon presentation of proper credentials, duly authorized representatives of the City may enter at reasonable times upon any property within the City to inspect the condition of the stormwater structures and facilities in regard to any aspect regulated by this Ordinance.

9-939 Notification

- (a) In the event that a person fails to comply with the requirements of this Ordinance, or fails to conform to the requirements of any permit issued hereunder, the City shall provide written notification of the violation. Such notification shall set forth the nature of the violation(s) and establish a time limit for correction of these violations(s). Failure to comply within the time specified shall subject such person to the penalty provision of this Ordinance. All such penalties shall be deemed cumulative and shall not prevent the City from pursuing any and all other remedies. It shall be the responsibility of the owner of the real property on which any Regulated Activity is proposed to occur, is occurring, or has occurred to comply with the terms and conditions of this Ordinance.

9-940 Enforcement

- (a) The City governing body is hereby authorized and directed to enforce all of the provisions of this Ordinance. All inspections regarding compliance with the Drainage Plan shall be the responsibility of the City or other qualified persons designated by the City.

- (b) A set of design plans approved by the City shall be on file at the site throughout the duration of the construction activity. The City or their designee may make periodic inspections during construction.

- (c) Adherence to Approved Plan

- (1) It shall be unlawful for any person, firm, or corporation to undertake any Regulated Activity under 9-935 on any property except as provided for in the approved Drainage Plan and pursuant to the requirements of this Ordinance. It shall be unlawful to alter or remove any control structure required by the Drainage Plan pursuant to this Ordinance or to allow the property to remain in a condition that does not conform to the approved Drainage Plan.

- (d) At the completion of the project and as a prerequisite for the release of the performance guarantee, the owner or his representatives shall:

- (1) Provide a certification of completion from an engineer, architect, surveyor or other qualified person verifying that all permanent facilities have been constructed according to the plans and specifications and approved revisions thereto.

- (2) Provide a set of as-built (record) drawings.

1918 (3) After receipt of the certification by the City, a final inspection shall be conducted
1919 by the governing body or its designee to certify compliance with this Ordinance.
1920

1921 (e) Prior to revocation or suspension of a permit, the governing body will schedule a hearing to
1922 discuss the non-compliance if there is no immediate danger to life, public health, or property.
1923

1924 (f) Suspension and Revocation of Permits
1925

1926 (1) Any building, land development, or other permit or approval issued under this
1927 Ordinance may be suspended or revoked by the governing body for:
1928

1929 (i) Non-compliance with or failure to implement any provision of
1930 the permit.
1931

1932 (ii) A violation of any provision of this Ordinance or any other
1933 applicable law, Ordinance, rule or regulation relating to the
1934 project.
1935

1936 (iii) The creation of any condition or the commission of any act
1937 during construction or development which constitutes or
1938 creates a hazard or nuisance, pollution, or which endangers the
1939 life or property of others.
1940

1941 (2) Suspended permit shall be reinstated by the governing body when:
1942

1943 (i) The City or his designee has inspected and approved the
1944 corrections to the stormwater management and erosion and
1945 sediment pollution control measure(s) or the elimination of the
1946 hazard or nuisance and/or;
1947

1948 (ii) The governing body is satisfied that the violation of the
1949 Ordinance, law, or rule and regulation has been corrected.
1950

1951 (3) A permit that has been revoked by the governing body cannot be reinstated. The
1952 Applicant may apply for a new permit under the procedures outlined in this
1953 Ordinance.
1954

1955 (g) Occupancy Permit
1956

1957 (1) An occupancy permit shall not be issued unless the certification of compliance
1958 pursuant to 9-940(d) has been secured. The occupancy permit shall be required
1959 for each lot owner and/or developer for all subdivisions and land development in
1960 the City.
1961

1962 **9-941 Public Nuisance**
1963

1964 (a) The violation of any provision of this Ordinance is hereby deemed a Public Nuisance.
1965

1966 (b) Each day that a violation continues shall constitute a separate violation.
1967
1968
1969

1970 **9-942** **Penalties**

1971

1972 (a) Any person who violates the provisions of this chapter shall be subject to the General Code
1973 Penalty, Section 1-301.99, of these Codified Ordinances.

1974

1975

1976

1977

1978

1979

1980

1981 **9-943** **Appeals**

1982

1983 (a) Any person aggrieved by any action of the City or its designee, relevant to the provisions of this
1984 Ordinance, may appeal to the City Housing Code Board of Appeals within thirty (30) days of
1985 that action.

1986

1987 (b) Any person aggrieved by any decision of the City's Housing Code Board of Appeals, relevant to
1988 the provisions of this Ordinance, may appeal to the Dauphin County Court of Common Pleas
1989 within thirty (30) days of the City's decision.

APPENDIX A - STORMWATER MANAGEMENT DESIGN CRITERIA

TABLE A-1 - DESIGN STORM RAINFALL AMOUNT

Return Interval (Year)	24-hour Rainfall Total (inches)
2	2.92
5	3.66
10	4.32
25	5.35
50	6.30
100	7.41

Source: NOAA Atlas 14

TABLE A-2 - RUNOFF CURVE NUMBERS (FROM NRCS (SCS) TR-55)

Runoff Curve Numbers for Urban Areas					
Cover Description		Curve Numbers for Hydrologic Soil Groups			
Cover Type and Hydrologic Condition	Average % Impervious Area	A	B	C	D
<i>Fully Developed Urban Areas (Vegetation Established)</i>					
Open Space (lawns, parks, golf courses, etc)					
Poor Condition (grass cover < 50%)		68	79	86	89
Fair Condition (grass cover 50% to 75%)		49	69	79	84
Good Condition (grass cover > 75%)		39	61	74	80
Impervious Areas					
Paved Parking Lots, Roofs, Driveways, etc.		98	98	98	98
Streets and Roads					
Paved: Curbed and Storm Sewers		98	98	98	98
Paved: Open Ditches		83	89	92	93
Gravel		76	85	89	91
Dirt		72	82	87	89
Western Desert Urban Areas					
Natural Desert Landscaping (pervious area only)		63	77	85	88
Artificial Desert Landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban Districts					
Commercial and Business	85%	89	92	94	95
Industrial	72%	81	88	91	93
Residential Districts by Average Lot Size					
1/8 Acres	65%	77	85	90	92
1/4 Acre	38%	61	75	83	87
1/3 Acre	30%	57	72	81	86
1/2 Acre	25%	54	70	80	85
1 Acre	20%	51	68	79	84
2 Acres	12%	46	65	77	82

Runoff Curve Numbers for Cultivated Agricultural Lands						
Cover Description			Curve Numbers for Hydrologic Soil Groups			
<i>Cover Type</i>	<i>Treatment</i>	<i>Hydrologic Condition</i>	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>
Fallow	Bare Soil	--	77	86	91	94
	Crop Residue Cover (CR)	Poor	76	85	90	93
		Good	74	83	88	90
Row Crops	Straight Row (SR)	Poor	72	81	88	91
		Good	67	78	85	89
	SR + CR	Poor	71	80	87	90
		Good	64	75	82	85
	Contoured (C)	Poor	70	79	84	88
		Good	65	75	82	86
	C + CR	Poor	69	78	83	87
		Good	64	74	81	85
	Contoured & Terraced (C & T)	Poor	66	74	80	82
		Good	62	71	78	81
	C & T + CR	Poor	65	73	79	81
		Good	61	70	77	80
Small Grain	SR	Poor	65	76	84	88
		Good	63	75	83	87
	SR + CR	Poor	64	75	83	86
		Good	60	72	80	84
	C	Poor	63	74	82	85
		Good	61	73	81	84
	C + CR	Poor	62	73	81	84
		Good	60	72	80	83
	C & T	Poor	61	72	79	82
		Good	59	70	78	81
	C & T + CR	Poor	60	71	78	81
		Good	58	69	77	80
Close Seeded or Broadcast Legumes Or Rotation Meadow	SR	Poor	66	77	85	89
		Good	58	72	81	85
	C	Poor	64	75	83	85
		Good	55	69	78	83
	C & T	Poor	63	73	80	83
		Good	51	67	76	80

Runoff Curve Numbers for Other Agricultural Lands						
Cover Description		Curve Numbers for Hydrologic Soil Groups				
Cover Type	Hydrologic Condition	A	B	C	D	
Pasture, Grassland, or Range – Continuous Forage for Grazing	Poor	68	79	86	89	
	Fair	49	69	79	84	
	Good	39	61	74	80	
Meadow – Continuous Grass, Protected from Grazing and Generally Mowed for Hay	--	30	58	71	78	
Brush – Brush, Weed, Grass Mixture with brush the major element	Poor	48	67	77	83	
	Fair	35	56	70	77	
	Good	30	48	65	73	
Woods – Grass Combination (orchard or tree farm)	Poor	57	73	82	86	
	Fair	43	65	76	82	
	Good	32	58	72	79	
Woods	Poor	45	66	77	83	
	Fair	36	60	73	79	
	Good	30	55	70	77	
Farmsteads – Buildings, Lanes, Driveways and Surrounding Lots.	--	59	74	82	86	
Runoff Curve Numbers for Cultivated Agricultural Lands						
Cover Description		Curve Numbers for Hydrologic Soil Groups				
Cover Type	Hydrologic Condition	A	B	C	D	
Herbaceous – Mixture of Grass, Weeds and Low-Growing Brush, With Brush the Minor Element.	Poor	--	80	87	93	
	Fair		71	81	89	
	Good		62	74	85	
Oak-Aspen – Mountain Brush Mixture of Oak Brush, Aspen, Mountain Mahogany, Bitter Brush, Maple and other brush.	Poor		66	74	79	
	Fair		48	57	63	
	Good		30	41	48	
Pinyon-Juniper – Pinyon, Juniper, or both; Grass under story.	Poor		75	85	89	
	Fair		58	73	80	
	Good		41	61	71	
Sagebrush With Grass under story.	Poor		67	80	85	

	Fair		51	63	70
	Good		35	47	55
Desert Shrub – Major Plants Include Saltbrush, Greasewood, Creosotebush, Blackbrush, Bursage, Palo Verde, Mesquite and Cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

TABLE A-3 - RATIONAL RUNOFF COEFFICIENTS

Character of Surface	Return Period (Yrs)						
	2	5	10	25	50	100	500
Developed							
Asphaltic	0.73	0.77	0.81	0.86	0.90	0.95	1.00
Concrete/Roof	0.75	0.80	0.83	0.88	0.92	0.97	1.00
Grass Areas (<i>lawn, parks, etc</i>)							
Poor condition (grass cover less than 50% of the area)							
Flat, 0-2%	0.32	0.34	0.37	0.40	0.44	0.47	0.58
Average, 2-7%	0.37	0.40	0.43	0.46	0.49	0.53	0.61
Steep, over 7%	0.42	0.43	0.45	0.49	0.52	0.55	0.62
Fair condition (grass cover on 50% to 75% of the area)							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Good condition (grass cover larger than 75% of the area)							
Flat, 0-2%	0.21	0.23	0.25	0.29	0.32	0.36	0.49
Average, 2-7%	0.29	0.32	0.35	0.39	0.42	0.46	0.56
Steep, over 7%	0.34	0.37	0.40	0.44	0.47	0.51	0.58
Undeveloped							
Cultivated Land							
Flat, 0-2%	0.31	0.34	0.36	0.40	0.43	0.47	0.57
Average, 2-7%	0.35	0.38	0.41	0.44	0.48	0.51	0.60
Steep, over 7%	0.39	0.42	0.44	0.48	0.51	0.54	0.61
Pasture/Range							
Flat, 0-2%	0.25	0.28	0.30	0.34	0.37	0.41	0.53
Average, 2-7%	0.33	0.36	0.38	0.42	0.45	0.49	0.58
Steep, over 7%	0.37	0.40	0.42	0.46	0.49	0.53	0.60
Forest/Woodlands							
Flat, 0-2%	0.22	0.25	0.28	0.31	0.35	0.39	0.48
Average, 2-7%	0.31	0.34	0.36	0.40	0.43	0.47	0.56
Steep, over 7%	0.35	0.39	0.41	0.45	0.48	0.52	0.58

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TABLE A-4 - MANNING ROUGHNESS COEFFICIENTS

Material	Typical Manning Roughness Coefficient
Concrete	0.012
Gravel Bottom with Sides - Concrete	0.02
- Mortared Stone	0.023
- RipRap	0.033
Natural Stream Channels	
Clean, Straight Stream	0.030
Clean, Winding Stream	0.040
Winding With Weeds and Pools	0.050
With Heavy Brush and Timber	0.100
Flood Plains	
Pasture	0.035
Field Crops	0.040
Light Brush and Weeds	0.050
Dense Brush	0.070
Dense Trees	0.100

DRAINAGE PLAN APPLICATION

(To be attached to the "land subdivision plan or development plan review application or "minor land subdivision plan review application")

Application is hereby made for review of the Drainage and Erosion and Sedimentation Control Plan and related data as submitted herewith in accordance with The City of Harrisburg's Stormwater Management and Earth Disturbance Ordinance.

_____ final plan _____ preliminary plan _____ sketch plan

Date of Submission: _____ Submission No: _____

Name of subdivision or development: _____

Name of Applicant _____ Telephone No. _____

(If corporation, list the corporation's name and the names of two officers of the corporation)

Address _____

City _____ Zip Code _____

Applicant's interest in subdivision or development _____

(If other than property owner give owners name and address)

Name of property owner _____ Telephone No. _____

Address _____ City _____

Zip Code _____

Name of engineer or surveyor _____

Telephone no. _____ Address _____

City _____ Zip Code _____

2083
2084
2085

Type of subdivision or development proposed:

<input type="checkbox"/> Single Family lots	<input type="checkbox"/> Townhouses	<input type="checkbox"/> Commercial (multi lot)
<input type="checkbox"/> Two Family lots	<input type="checkbox"/> Garden Apartments	<input type="checkbox"/> Commercial (one lot)
<input type="checkbox"/> Cluster lots	<input type="checkbox"/> Campground	<input type="checkbox"/> Industrial (one lot)
<input type="checkbox"/> Planned Residential	<input type="checkbox"/> Other	

2086
2087
2088
2089
2090

If other, describe type of development _____

Lineal feet of new road proposed? _____ l.f.

2091
2092

Area of proposed and existing impervious area on entire tract.

2093
2094
2095

Existing (to remain)	_____ s.f.	_____ % of property
Proposed	_____ s.f.	_____ % of property

2096
2097

Stormwater

2098
2099
2100
2101

Does the peak rate of runoff from proposed conditions exceed that flow which occurred for predevelopment conditions for the designated design storm?

2102
2103
2104

Design storm utilized (on-site conveyance systems) (24 hr.)
(Check one)

2105
2106
2107
2108

-No. of Subwatershed Area _____
-Watershed name _____
-If other, explain: _____

2109
2110
2111

Does the submission meet the release rate and/or district criteria for the applicable sub area?

2112
2113
2114

Number of sub areas from Plate 6, of the _____ Watershed Stormwater Management Plan.

2115
2116
2117

Type of proposed runoff control _____

2118
2119
2120

Does the proposed stormwater control criterion meet the requirement/guidelines of the stormwater Ordinance? _____

2121
2122

Does the plan meet the requirements of Article III of the Stormwater Ordinance? _____

2123
2124
2125

Was TR-55 utilized in determining the time of concentration? _____

2126
2127
2128

What hydrologic method was used in the stormwater computations? _____
Is a hydraulic routing through the stormwater control structure submitted? _____

2129
2130 Is a construction schedule or staging attached? _____
2131
2132 Is a recommended maintenance program attached? _____
2133
2134 Has an Erosion and sediment pollution control (E&S Plan) been submitted to the Dauphin County
2135 Conservation District?
2136
2137 Total area of earth disturbance _____ s.f.
2138
2139 **Wetlands**
2140
2141 Have the wetlands been delineated by someone trained in wetland delineation?
2142 _____
2143
2144 Have the wetland lines been verified by a state or federal permitting authority?
2145 _____
2146
2147 Have the wetland lines been surveyed? _____
2148
2149 Total acreage of wetland within the property _____
2150
2151 Total acreage of wetland disturbed _____
2152
2153 Supporting documentation _____
2154
2155 **Filing**
2156
2157 Has the required fee been submitted? _____
2158
2159 Amount \$ _____
2160
2161 Has the proposed schedule of construction inspection to be performed by the Applicant's engineer been
2162 submitted? _____
2163
2164 Name of individual who will be making the inspections _____
2165 _____
2166
2167 General comments about stormwater management at development site
2168 _____
2169 _____
2170 _____

CERTIFICATE OF OWNERSHIP AND ACKNOWLEDGMENT OF APPLICATION:
COMMONWEALTH OF PENNSYLVANIA COUNTY OF _____

On this the _____ day of _____, 20____, before me, the undersigned officer,
personally appeared _____
who being duly sworn, according to law, deposes and says that _____
_____owners of the property described in this application and that the application was made
with _____ knowledge and/or direction and does hereby agree with the said
application and to the submission of the same.

Property Owner(s)

My Commission Expires _____, 20_____

Notary Public

THE UNDERSIGNED HEREBY CERTIFIES THAT TO THE BEST OF HIS
KNOWLEDGE AND BELIEF THE INFORMATION AND STATEMENTS GIVEN
ABOVE ARE TRUE AND CORRECT.

SIGNATURE OF APPLICANT _____

This Information to Be Completed By the Municipality

Municipality official submission receipt

Date complete application received _____ plan number _____

Fees _____ date fees paid _____ received by _____

Official submission receipt date _____

Received by _____

2218	FEE SCHEDULE	
2219	_____ Municipality	Drainage Plan Schedule of Fees
2220		
2221	Subdivision name _____	Submittal no. _____
2222		
2223	Owner _____	Date _____
2224		
2225	Engineer _____	
2226		
2227	1. Filing fee	\$ _____
2228	2. Land use	
2229	2a. Subdivision, campgrounds, mobile home parks and	\$ _____
2230	Multi-family dwelling where the units are located	
2231	in the same local watershed	
2232	2b. Multi-family dwelling where the designated open space	\$ _____
2233	is located in a different local watershed from the	
2234	proposed units.	
2235	2c. Commercial/industrial	\$ _____
2236	3. Relative amount of earth disturbance	
2237	3a. Residential	
2238	road <500 l.f.	\$ _____
2239	road 500-2,640 l.f.	\$ _____
2240	road >2,640 l.f.	\$ _____
2241	3b. Commercial/industrial and other	
2242	impervious area <3,500 s.f.	\$ _____
2243	impervious area 3,500-43,460 s.f.	\$ _____
2244	impervious area >43,560 s.f.	\$ _____
2245	4. Relative size of project	
2246	4a. Total tract area <1 ac	\$ _____
2247	1-5 ac	\$ _____
2248	5-25 ac	\$ _____
2249	25-100 ac	\$ _____
2250	100-200 ac	\$ _____
2251	>200 ac	\$ _____
2252	5. Stormwater control measures	
2253	5a. Detention basins & other controls which	\$ _____
2254	require a review of hydraulic routings	
2255	(\$ per control)	
2256	5b. Other control facilities which require	\$ _____
2257	storage volume calculations but no hydraulic	
2258	routings. (\$ per control)	
2259		
2260	6. Site inspection (\$ per inspection)	\$ _____
2261		
2262	Total	\$ _____
2263		

2264 All subsequent reviews shall be 1/4 the amount of the initial review fee unless a new application is
2265 required as per Article IV of the stormwater Ordinance. A new fee shall be submitted with each revision
2266 in accordance with this schedule.

APPENDIX C - MAINTENANCE & MONITORING AGREEMENT

STANDARD STORMWATER FACILITIES MAINTENANCE AND MONITORING AGREEMENT

THIS AGREEMENT, made and entered into this _____ day of _____, 20____, by and between _____, (hereinafter the "Landowner") and _____, _____ County; Pennsylvania, (hereinafter "Municipality");

WITNESSETH

WHEREAS, the Landowner is the owner of certain real property as recorded by deed in the land records of _____ County, Pennsylvania, Deed Book _____ at Page _____, (hereinafter "Property").

WHEREAS, the Landowner is proceeding to build and develop the Property; and

WHEREAS, the Subdivision/Land Management Plan (hereinafter "Plan") for the _____ Subdivision which is expressly made a part hereof, as approved or to be approved by the Municipality, provides for detention or retention of stormwater within the confines of the Property; and

WHEREAS, the Municipality and the Landowner, his successors and assigns agree that the health, safety and welfare of the residents of the Municipality require that on-site stormwater management facilities be constructed and maintained on the Property: and

WHEREAS, the Municipality requires, through the implementation of the _____ Watershed Stormwater Management Plan, that stormwater management facilities as shown on the Plan be constructed and adequately maintained by the Landowner, his successors and assigns.

NOW, THEREFORE, in consideration of the foregoing premises, the mutual covenants contained herein and the following terms and conditions, the parties hereto agree as follows:

The on-site stormwater management facilities shall be constructed by the Landowner, his successors and assigns, in accordance with the terms, conditions and specifications identified in the Plan.

The Landowner, his successors and assigns, shall maintain the stormwater management facilities in good working condition, acceptable to the Municipality so that they are performing their design functions

The Landowner, his successors and assigns, hereby grants permission to the Municipality, his authorized agents and employees, upon presentation of proper identification, to enter upon the Property at reasonable times to inspect the stormwater management facilities whenever the Municipality deems necessary. The purpose of the inspection is to assure safe and proper functioning of the facilities. The inspection shall cover the entire facilities, berms, outlet structures, pond areas, access roads, etc. When inspections are conducted, the Municipality shall give the Landowner, his successors and assigns, copies of the inspection report with findings and evaluations. At a minimum, maintenance inspections shall be performed in accordance with the following schedule:

2307 Annually for the first five (5) years after the construction of the stormwater facilities,
2308 Once every two (2) years thereafter, or
2309 During or immediately upon the cessation of a 100 year or greater precipitation event.
2310
2311 All reasonable costs for said inspections shall be born by the Landowner and payable to the
2312 Municipality.
2313
2314 The owner shall convey to the Municipality easements and/or rights-of-way to assure access for periodic
2315 inspections by the Municipality and maintenance if required.

2316 In the event the Landowner, his successors and assigns, fails to maintain the stormwater management
2317 facilities in good working condition acceptable to the Municipality, the Municipality may enter upon
2318 the property and take such necessary and prudent action to maintain said stormwater management
2319 facilities and to charge the costs of the maintenance and/or repairs to the Landowner, his successors
2320 and assigns. This provision shall not be construed as to allow the Municipality to erect any structure
2321 of a permanent nature on the land of the Landowner outside of any easement belonging to the
2322 Municipality. It is expressly understood and agreed that the Municipality is under no obligation to
2323 maintain or repair said facilities and in no event shall this Agreement be construed to impose any such
2324 obligation on the Municipality.

2325 The Landowner, his successors and assigns, will perform maintenance in accordance with the
2326 maintenance schedule for the stormwater management facilities including sediment removal as
2327 outlined on the approved schedule and/or Subdivision/Land Management Plan.

2328 In the event the Municipality, pursuant to this Agreement, performs work of any nature, or expends any
2329 funds in performance of said work for labor, use of equipment, supplies, materials and the like on
2330 account of the Landowner's or his successors' and assigns' failure to perform such work, the
2331 Landowner, his successors and assigns, shall reimburse the Municipality upon demand, within 30
2332 days of receipt of invoice thereof, for all costs incurred by the Municipality hereunder. If not paid
2333 within said 30-day period, the Municipality may enter a lien against the property in the amount of
2334 such costs or may proceed to recover his costs through proceedings in equity or at law as authorized
2335 under the provisions of the _____ Code.

2336 The Landowner, his successors and assigns, shall indemnify the Municipality and his agents and
2337 employees against any and all damages, accidents, casualties, occurrences or claims which might
2338 arise or be asserted against the Municipality for the construction, presence, existence or maintenance
2339 of the stormwater management facilities by the Landowner, his successors and assigns.

2340 In the event a claim is asserted against the Municipality, his agents or employees, the Municipality shall
2341 promptly notify the Landowner, his successors and assigns and they shall defend, at their own
2342 expense, any suit based on such claim. If any judgment or claims against the Municipality, his agents
2343 or employees shall be allowed, the Landowner, his successors and assigns shall pay all costs and
2344 expenses in connection therewith.

2345 In the advent of an emergency or the occurrence of special or unusual circumstances or situations, the
2346 Municipality may enter the Property, if the Landowner is not immediately available, without
2347 notification or identification, to inspect and perform necessary maintenance and repairs, if needed,
2348 when the health, safety or welfare of the citizens is at jeopardy. However, the Municipality shall
2349 notify the landowner of any inspection, maintenance, or repair undertaken within 5 days of the
2350 activity. The Landowner shall reimburse the Municipality for his costs.
2351

2352
2353 This Agreement shall be recorded among the land records of _____
2354 County, Pennsylvania and shall constitute a covenant running with the Property and/or equitable
2355 servitude and shall be binding on the Landowner, his administrators, executors, assigns, heirs and
2356 any other successors in interests, in perpetuity.
2357

2358 ATTEST:

2359 WITNESS the following signatures and seals:

2360 (SEAL)

For the Municipality:

2361 _____

2362 (SEAL) For the Landowner:

2363 _____

2364

2365 ATTEST:

2366 _____ (City, Borough, Township)

2367 County of _____, Pennsylvania

2368

2369 I, _____, a Notary Public in and for the County and State
2370 aforesaid, whose commission expires on the _____ day of _____, 20__, do hereby
2371 certify that _____ whose name(s) is/are signed to the
2372 foregoing Agreement bearing date of the _____ day of _____, 20__, has
2373 acknowledged the same before me in my said County and State.

2374

2375 GIVEN UNDER MY HAND THIS _____ day of _____, 20__.

2376 _____

2377 NOTARY PUBLIC (SEAL)

2378

2379

2380

APPENDIX D - CHANNEL PROTECTION STORAGE

The following procedure shall be used to design the Channel Protection Storage Volume (Cp_v). The method is based on the Design Procedures for Stormwater Management Extended Detention Structures (MDE, 1987) and utilizes the NRCS, TR-55 Graphical Peak Discharge Method (USDA, 1986).

Compute the time of concentration (tc) and the one-year post-development runoff depth (Qa) in inches.

$$Qa = \frac{(P - Ia)^2}{(P - Ia) + S} \quad Qa = \frac{(2.5 - Ia)^2}{(2.5 - Ia) + S} \quad \text{where } S = (1000/CN) - 10$$

$$Ia = (200/CN) - 2$$

$P = 2.5'' = 1\text{-year rainfall depth}$

Compute the ratio Ia/P where $P = 2.5''$ and is the one-year rainfall depth (Source: NRCS (SCS) TR-55).

With tc and Ia/P , find the unit peak discharge (qu) from Figure D.1 and compute the one year post-development peak discharge $qi = (qu)(A)(Qa)$ where (A) is the drainage area in **square miles**. Therefore, qi represents the peak inflow to the BMP.

If $Qi \geq 2.0$ cfs, Cp_v is required. With qu , find the ratio of outflow to inflow (qo/qi) for $T = 24$ hours from Figure D.2.

Compute the peak outflow discharge $qo = (qo/qi)(qi)$

With qo/qi , compute the ratio of storage to runoff volume (V_s/V_r). Where V_s = volume of storage and V_r = volume of runoff

$$V_s/V_r = 0.683 - 1.43(qo/qi) + 1.64(qo/qi)^2 - 0.804(qo/qi)^3$$

Compute the extended detention storage in inches $V_i = (V_s/V_r)(V_r)$. **Note:** $V_r = Qa$

Compute the extended detention storage volume $Cp_v = (V_i)(A)$ where A is the total drainage area in acres. Convert Cp_v to acre-feet by $(Cp_v/12)$, where Cp_v is in inches.

Compute the required orifice area Ao for extended detention design:

$$Ao = \frac{qo}{C(2gho)^{0.5}} = \frac{qo}{4.18(ho)^{0.5}}$$

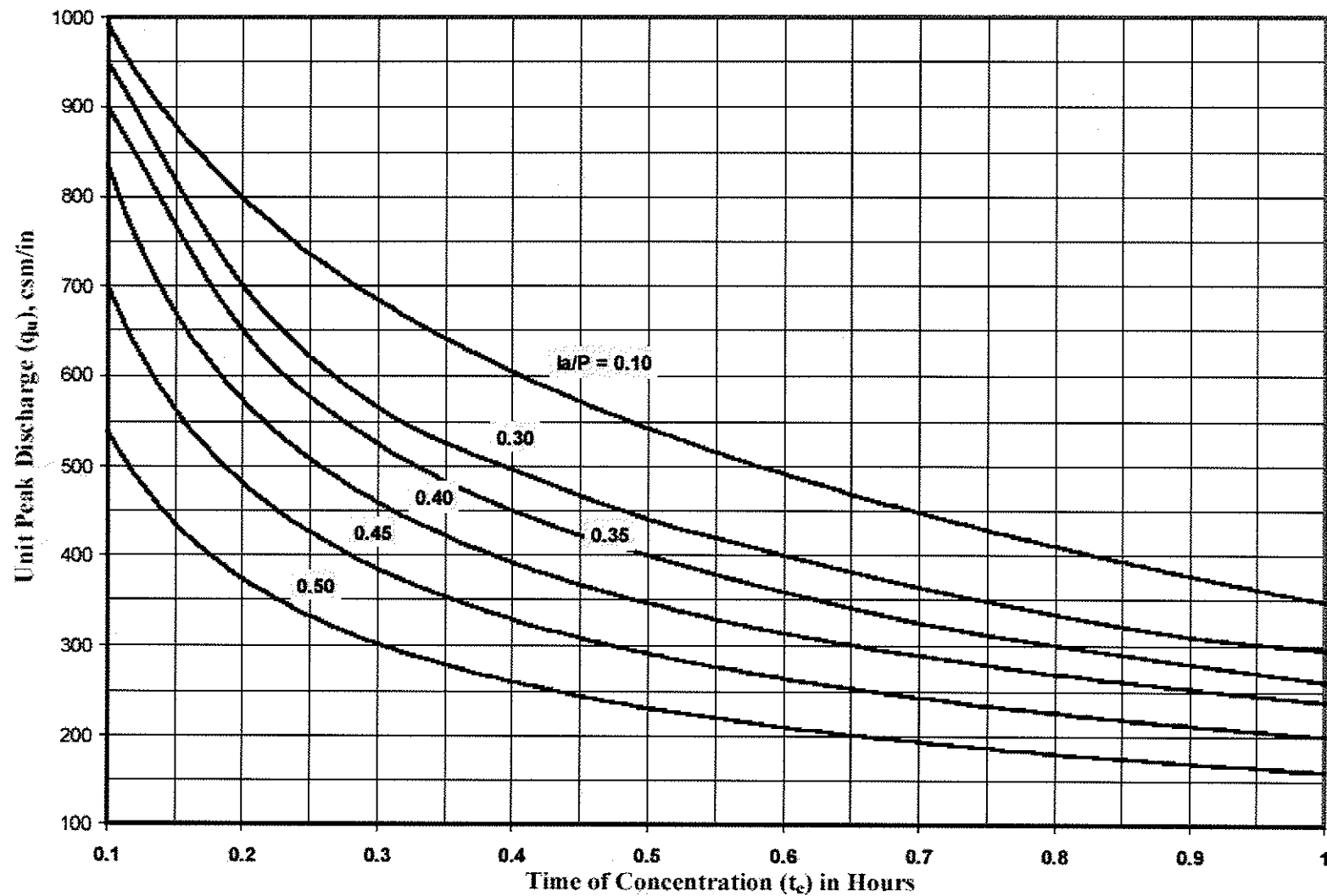
Where ho is the maximum storage depth associated with V_s .

Determine the required maximum orifice diameter $do = (4(Ao)/\pi)^{0.5}$

A do of less than 3 inches is subject to local jurisdictional approval, and is not recommended unless an internal control for orifice protection is used.

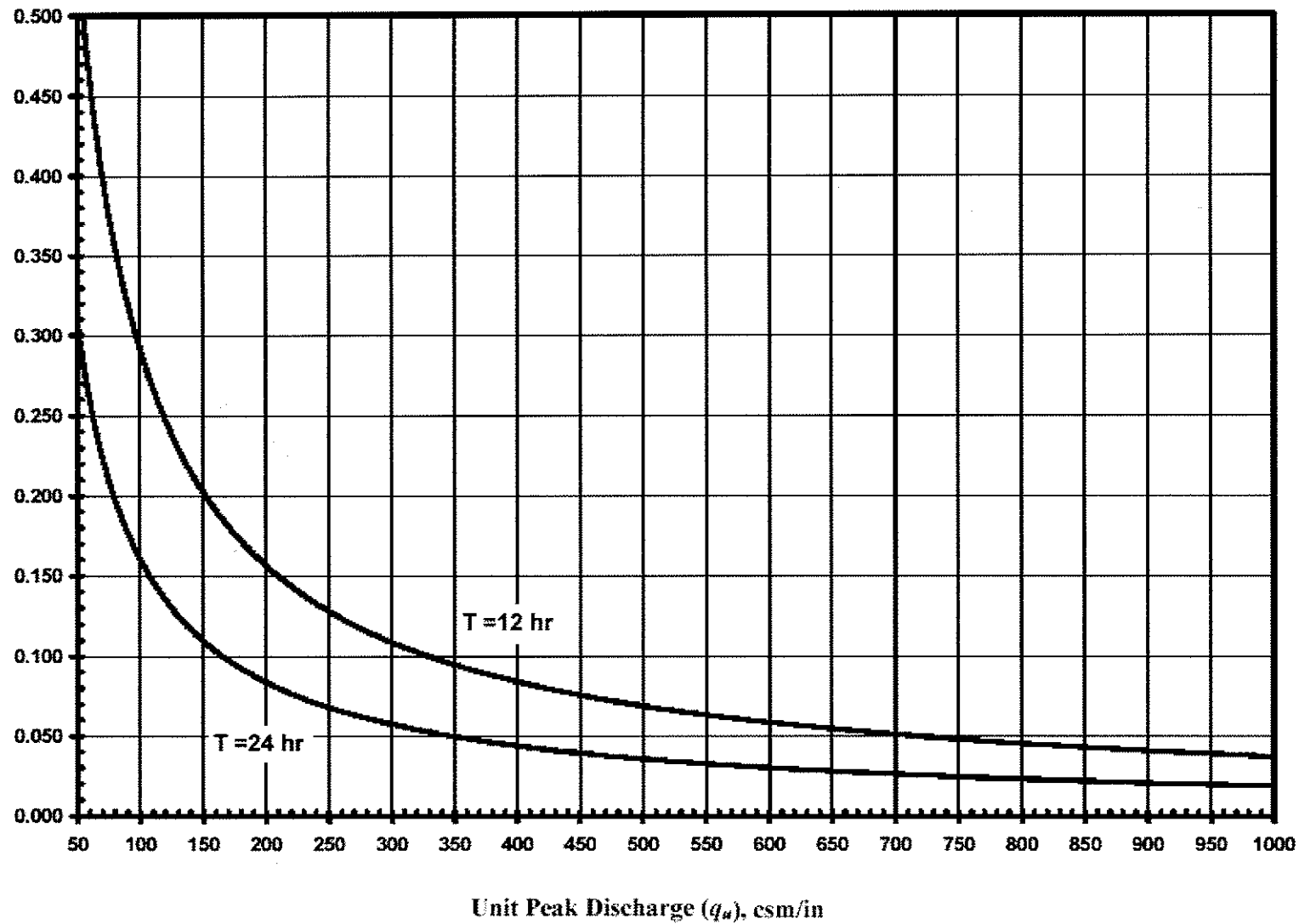
- **If $Qi \leq 2.0$ cfs, Cp_v is not required.** Provide for water quality (WQ_v) and groundwater recharge (Re_v) as necessary.

2430 Figure D.1 SCS Graphical Method of Determining Peak Discharge (q_u) in csm/in
 2431 For 24-Hour Type II Storm Distribution



2432

2433 **Figure D.2 Detention Time Versus Discharge Ratios (q_0/q_i)**



2434

**LOW IMPACT DEVELOPMENT PRACTICES
ALTERNATIVE APPROACH FOR
MANAGING STORMWATER RUNOFF**

Natural hydrologic conditions may be altered radically by poorly planned development practices, such as introducing unneeded impervious surfaces, destroying existing drainage swales, constructing unnecessary storm sewers, and changing local topography. A traditional drainage approach of development has been to remove runoff from a site as quickly as possible and capture it in a detention basin. This approach leads ultimately to the degradation of water quality as well as expenditure of additional resources for detaining and managing concentrated runoff at some downstream location.

The recommended alternative approach is to promote practices that will minimize post-development runoff rates and volumes, which will minimize needs for artificial conveyance and storage facilities. To simulate pre-development hydrologic conditions, forced infiltration is often necessary to offset the loss of infiltration by creation of impervious surfaces. The ability of the ground to infiltrate depends upon the soil types and its conditions.

Preserving natural hydrologic conditions requires careful alternative site design considerations. Site design practices include preserving natural drainage features, minimizing impervious surface area, reducing the hydraulic connectivity of impervious surfaces, and protecting natural depression storage. A well-designed site will contain a mix of all those features. The following describes various techniques to achieve the alternative approach:

- ◆ Preserving Natural Drainage Features. Protecting natural drainage features, particularly vegetated drainage swales and channels, is desirable because of their ability to infiltrate and attenuate flows and to filter pollutants. However, this objective is often not accomplished in land development. In fact, commonly held drainage philosophy encourages just the opposite pattern -- streets and adjacent storm sewers typically are located in the natural headwater valleys and swales, thereby replacing natural drainage functions with a completely impervious system. As a result, runoff and pollutants generated from impervious surfaces flow directly into storm sewers with no opportunity for attenuation, infiltration, or filtration. Developments designed to fit site topography also minimizes the amount of grading on site.
- ◆ Protecting Natural Depression Storage Areas. Depressional storage areas have no surface outlet, or drain very slowly following a storm event. They can be commonly seen as ponded areas in farm fields during the wet season or after large runoff events. Traditional development practices eliminate these depressions by filling or draining, thereby obliterating their ability to reduce surface runoff volumes and trap pollutants. The volume and release-rate characteristics of depressions should be protected in the design of the development site. The depressions can be protected by simply avoiding the depression or by incorporating its storage as additional capacity in required detention facilities.
- ◆ Avoiding introduction of impervious areas. Careful site planning should consider reducing impervious coverage to the maximum extent possible. Building footprints, sidewalks, driveways and other features producing impervious surfaces should be evaluated to minimize impacts on runoff.

- ◆ Reducing the Hydraulic Connectivity of Impervious Surfaces. Impervious surfaces are significantly less of a problem if they are not directly connected to an impervious conveyance system (such as storm sewer). Two basic ways to reduce hydraulic connectivity are routing of roof runoff over lawns and reducing the use of storm sewers. Site grading should promote increasing travel time of stormwater runoff, and should help reduce concentration of runoff to a single point in the development.
- ◆ Routing Roof Runoff over Lawns. Roof runoff can be easily routed over lawns in most site designs. The practice discourages direct connections of downspouts to storm sewers or parking lots. The practice also discourages sloping driveways and parking lots to the street. By routing roof drains and crowning the driveway to run off to the lawn, the lawn is essentially used as a filter strip.
- ◆ Reducing the Use of Storm Sewers. By reducing use of storm sewers for draining streets, parking lots, and back yards, the potential for accelerating runoff from the development can be greatly reduced. The practice requires greater use of swales and may not be practical for some development sites, especially if there are concerns for areas that do not drain in a “reasonable” time. The practice requires educating local citizens and public works officials, who expect runoff to disappear shortly after a rainfall event.
- ◆ Reducing Street Widths. Street widths can be reduced by either eliminating on-street parking or by reducing roadway widths. Borough planners and traffic designers should encourage narrower neighborhood streets that ultimately could lower maintenance.
- ◆ Limiting Sidewalks to One Side of the Street. A sidewalk on one side of the street may suffice in low-traffic neighborhoods. The lost sidewalk could be replaced with bicycle/recreational trails that follow back-of-lot lines. Where appropriate, backyard trails should be constructed using pervious materials.
- ◆ Using Permeable-Paving Materials. These materials include permeable interlocking concrete paving blocks or porous bituminous concrete. Such materials should be considered as alternatives to conventional pavement surfaces, especially for low use surfaces such as driveways, overflow parking lots, and emergency access roads.
- ◆ Reducing Building Setbacks. Reducing building setbacks reduces driveway and entry walks and is most readily accomplished along low-traffic streets where traffic noise is not a problem.
- ◆ Constructing Cluster Developments. Cluster developments can also reduce the amount of impervious area for a given number of lots. The biggest savings is in street length, which also will reduce costs of the development. Cluster development clusters the construction activity onto less-sensitive areas without substantially affecting the gross density of development.

In summary, a careful consideration of the existing topography and implementation of a combination of the above mentioned techniques may avoid construction of costly stormwater control measures. Other benefits include reduced potential of downstream flooding, water quality degradation of receiving streams/water bodies and enhancement of aesthetics and reduction of development costs. Beneficial results include more stable base flows in receiving streams, improved groundwater

2534 recharge, reduced flood flows, reduced pollutant loads, and reduced costs for conveyance and
2535 storage.

2536 **Repealer**

2537

2538 (a) Any ordinance or ordinance provision(s) of the City inconsistent with any of the provision(s)
2539 of this Ordinance is hereby repealed to the extent of the inconsistency only.

2540

2541 (b) Except for inconsistent Ordinances and Practices that are repealed by this Ordinance, local
2542 storm water management design criteria (e.g. inlet spacing, inlet type, collection system
2543 design and details, outlet structure design, etc.) shall continue to be regulated by the
2544 applicable City Ordinances or at the City's discretion.

2545

2546 **Severability**

2547

2548 (a) Should a court of competent jurisdiction declare any section(s) or provision(s) of this
2549 Ordinance invalid, such decision shall not affect the validity of any of the remaining
2550 section(s) or provision(s) of this Ordinance.

2551

2552 **Compatibility with Other Ordinance Requirements**

2553

2554 (a) Approvals issued pursuant to this Ordinance do not relieve the Applicant of the responsibility
2555 to comply with or to secure required permits or approvals for activities regulated by any other
2556 applicable codes, rules, statutes, or ordinances. To the extent that this Ordinance imposes
2557 more rigorous or stringent requirements for stormwater management, the specific
2558 requirements contained in this Ordinance shall be followed.

2559

2560

2561 **Effective Date**

2562

2563 This ordinance shall take effect in accordance with the law.

2564

2565

2566 Seconded by: _____

Exhibit 7
City's Bureau of Neighborhood Services Maintenance Reports for
October 2009 and June 2010

City of Harrisburg

Bureau of Neighborhood Services

October

2009

Ricardo A. Davis, Director

Street Cleaning

The street sweepers were on schedule throughout the month. The sweepers collected 247,944 pounds or 123.97 tons of street debris during the 19 days that sweepers were scheduled out during the ninth month of the year. Total for the first ten months of the year 1,511,544 pounds or 755.77 tons have been collected.

Illegal Bulk

We collected 107,500 pounds or 53.57 tons of items during the month of September. Total for the first ten months of the year 1,223,500 pounds or 611.57 tons of bulk and debris have been collected.

Potholes

Potholes were filled in on 2 days during the month using 2.71 tons of Asphalt. Total for the first ten months of the year, we filled in Potholes on 64 days using 17.31 tons of Asphalt.

Barricades

20 sets of barricades were distributed during the month for 6 different events. Total for the year, 1,232 sets of Barricades were distributed for 97 different events.

Training

Training was conducted during the month of October, showing the men how to properly grease the Packers.

Demolition

The Demolition Crew has been working at 1501 and 1503 Regina Street which just needs one more day to finish back filling. Total for the first 10 months of the year, 25 properties have been completed.

Trash collection

The Bureau collected 2,313.57 tons of trash and 111.70 tons of recycling during the tenth month of the year. An estimated 5.31 tons of litter from sidewalk receptacles was also collected. The total weight collected for the year is **18,943.67** tons of trash, **1,073.3** tons of recycling and **48.67** tons of litter from sidewalk receptacles.

Bulk for Charge

In 2004, the Bureau started collecting bulk items from residents with an assigned charge per item. These bulk items, which were previously accepted at the Steam Plant or just collected as regular household trash, are now collected from residents, to afford the residents a means for discarding of bulk items at a minimal charge. \$325.00 worth of items were collected in October. Total for the year, **\$2,849.00** worth of items have been collected.

Storm Inlets Repaired

No Storm Inlets were repaired in October.

Sanitary Sewers cleaned by the Vactor

Six Sanitary Sewers were cleaned in October. The locations cleaned by date were:

10/5- Yew Place	10/23- 2400 Blk Rudy Rd
10/6- 2737 N 4 th St	10/19-Wilson Taylor Park (2 lines)
10/8- 372 Wyatt St	10/28- Briggs and Susquehanna St

Sanitary Sewers

The Sanitary Sewer System is checked on a daily basis to keep water flowing throughout the main lines in the system. The following list is of the manholes that needed special attention during the month either by adding chemicals to break up grease or other solids, or using a long pole to move paper back into the main flow channels:

7 th and Antoine – 1 time	3 rd and Wiconisco – 1 time
Hale and Rudy – 1 time	29 th and Heather – 1 time
385 Yew – 1 time	5 th and Peffer – 1 time
2264 Kensington – 1 time	Carey and Market – 1 time
2972 Heather – 1 time	2233 Kensington – 1 time
Thomas and Market – 1 time	19 th and Primrose – 1 time
22 nd and Kensington – 1 time	20 th and Derry – 1 time
Goodyear and Knox – 2 times	2230 Green – 1 time
2737 N. 4 th – 1 time	640 S. 25 th - 1 time
Jefferson and Woodland – 1 time	5 th and Antoine – 1 time
2230 Kensington – 1 time	2964 Heather – 1 time
2734 Reel – 1 time	Dunkle and Derry – 1 time
17 th and Revere – 1 time	Waldo and Radnor – 1 time
2600 block of Green – 1 time	17 th and Putnam – 1 time
2500 block of Green – 2 times	Cameron and Elliot - 1 time
2 nd and Vine – 1 time	15 th and Liberty – 1 time
Croyden and Wyatt – 1 time	19 th and Mulberry – 1 time
Turner and Emerald – 1 time	2200 block of Swatara – 1 time

V.M.C. Charges

Fuel	8,425.00
Oil	912.53
Parts	13,088.42
Tires and Batteries	3,009.26
Labor	18,829.67
Lube	0

Total	\$44,264.88
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Goals for November

- 1. Continue Demolition Schedule.**
- 2. Continue Illegal Bulk Pick-up and Bulk for Charge.**
- 3. Schedule more Storm Inlet repairs.**
- 4. Continue Neighborhood Nuisance Tasks.**
- 5. Schedule more Sinkholes.**
- 6. Carry out our Leaf Season.**

Sinkholes

No Sinkholes were completed in October.

Sewer Lines Televised

One Sanitary Sewer line, at 136 Walnut St, was televised in October

Leave Used

Members of the Bureau used Eight Hundred Twenty-eight (828) hours of leave in October.

Manhole Casings

No manhole casings and lids were replaced in October.

Storm Inlets Cleaned by the Vactor

16 Storm Inlets were cleaned in October. The locations and dates were:

10/15- 16th and Liberty

10/15- 2000 Blk Whitehall

10/23- 2146 Greenwood St, 18th and Chestnut St, 18th and Market St

10/26- Muench and Fulton, 2212 Jefferson

10/28- 4th and Division St, Briggs and Susquehanna, Cameron St (2) inlets cleaned

10/29- 1100 Bailey St (2) inlets cleaned, 20th and Market St, 7th and Division

Neighborhood Nuisance Abatement Unit

The Bureau's Neighborhood Nuisance Abatement Unit went back to Allison Hill and started cleaning Alleys and Lots and other tasks such as removing signs illegally posted on telephone poles and collecting illegally dumped bulk items. We will work our way throughout the whole City again following the same schedule we did for the Bulk Pick-up.

The abatement unit cleaned Lots and Alleys in the area from Cameron to 21st Streets and from State to Derry Streets and then the area from Cameron to 21st Streets and Derry to Paxton Street was cleaned up. 87,500 pounds or 43.75 tons of Illegal Bulk items and debris were collected. The unit also removed 19 signs that were illegally posted on telephone poles in this area. The area where the unit found the most volume of illegal dumped items was from 13th to Evergreen Streets near Chestnut Street.

7/23/16

City of Harrisburg
Bureau of Neighborhood Services
Mid-Monthly Report

June
2010

Ricardo A. Davis, Director

Personnel:

- Employees in the bureau used 866.50 hours of leave (sick, vacation, and personal)
- Average leave usage is 841.08 hours

Sanitation:

- Total June tonnage collected to date is 2,692 tons
- Total from sidewalk receptacles is estimated at 5.89 tons
- Recycling total is 103.22 tons
- DEP inspected our trucks 6/8/10 we had four violations that we know of and must wait to see if they send any others.
- VMC corrected these and others that day, to get our trucks back on the road.

Highway & Neighborhood Services:

- Street sweeping has been on schedule during the month of June
- Street sweeping debris totaled 95.13 tons.
- Thirty-six manholes are checked regularly to maintain consistent water flow throughout the system.
- Regular pothole work has been consistent. So far, at 53 potholes have been addressed.
- A Sinkhole was repaired at the 100 block of Sayford st.
- Storm inlet was cleared out at 2003 Briggs st.

Demolition:

- The Demo crew is currently working on 5 houses on S. 12th Street.
- This crew has also been assisting with the bulk pick-up.

Bulk Pick-Up

- There was no bulk pickup during the last month of June due to holiday preparations.
- Most recently we completed zone #9 - 17th-21st from State to the Bypass
- We removed 62.03 tons of bulk in Zones 8 & 9

Goals

- Expand on the strides made in Sanitation regarding consistency and productivity
- Continue progress with Demolition and stay on schedule. Our goal for Demo this year is 2.5 houses per month.
- Continue to increase inlet and pothole repair.